TRANSACTIONS

OF THE

AMERICAN SOCIETY OF CIVIL ENGINEERS

INDEX
VOLUME 131
1966

SUBJECT INDEX, PAGE 919
AUTHOR INDEX, PAGE 957

SUBJECT INDEX

ADMIXTURES
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634

AERATION
Better Activated Sludge by the Kessener-Brush Aeration Process, H. R. Carter, 792

AERODYNAMICS
Combined Aerodynamic and Structural Design of Light-Weight Flight Structures, Robert W. Fralich, 505
Washington—Legacy of Galloping Gertie (Tacoma Narrows Bridge), Robert Goller, 704

AERO-SPACE TRANSPORT
Aircraft Arresting System, Francis J. Rhody, 685
The Airport and its Approaches, James R. Carr and John R. Eva, 593
All-Weather Landing Systems, Alexander B. Winick, 759
Combined Aerodynamic and Structural Design of Light-Weight Flight Structures, Robert W. Fralich, 505
Evolution and Future of Airport Passenger Terminals, Arnold W. Thompson, 297
Florida—Criteria for Construction in Creating Another Cape Kennedy Colossus, George H. Kirkland, 694
Influence of V/STOL Aircraft on Airport Design, R. Dixon Speas and Harry P. Schmidt, 742
Jet Cargo Facility Requirements, Stuart R. Wallace, 718
Jet Transport Characteristics Related to Airports, Robert Horonjeff and Gale Ahlborn, 150
Operation of the Supersonic Transport at Airports, William Magruder, 351
Stress Repetitions in Pavement Design, Richard G. Ahlvin and Donald N. Brown, 782

AGGREGATES
Mathematical Method for Blending Aggregates, Donald L. Neumann, 64

AGRICULTURAL ENGINEERING
Analysis of Water Advance in Surface Irrigation, Yu-Si Fok and A. Alvin Bishop, 669

AGRICULTURE
Rice Irrigation, Lee Chow, 724

AIRCRAFT
Aircraft Arresting System, Francis J. Rhody, 685

AIR-ENTRAINING CONCRETE
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634

AIRFIELDS
Military Engineering in Vietnam, Peter A. Corradi, 617

AIR POLLUTION
Air Pollution from Incinerators—Causes and Cures, Leo P. Flood, 734
New York City's Air Pollution Index, M. M. Braverman and C. Theophil, 265
Urban Atmospheric Pollution, Albert F. Bush, 325

AIRPORTS
Aircraft Arresting System, Francis J. Rhody, 685
The Airport and its Approaches, James R. Carr and John R. Eva, 593
Evolution and Future of Airport Passenger Terminals, Arnold W. Thompson, 297
Influence of V/STOL Aircraft on Airport Design, R. Dixon Speas and Harry P. Schmidt, 742
Operation of the Supersonic Transport at Airports, William Magruder, 351
Airports and Transit Systems—the Engineer's Challenge, J. K. Carr, 233
Jet Transport Characteristics Related to Airports, Robert Horonjeff and Gale Ahlborn, 150
Planning a National Airport System to Serve the 70's, Cole Morrow, 512
Transportation Centers, Wilbur S. Smith, 137

ALUMINUM
Design of Aluminum Tubular Members, John W. Clark and Richard L. Rolf, 271

(ASCE) ETHICS
Product Endorsement by Engineers, William H. Wisely, 305
Unethical Sabotage of Public Projects, William H. Wisely, 708

(ASCE) FINANCE
The Economics of ASCE Technical Publications, William H. Wisely, 720

(ASCE) LOCAL SECTIONS
You and Your Local Section, W. L. Chadwick, 222

(ASCE) PROFESSIONAL OBJECTIVES
Are We Geared to Long-Range Objectives?, Wallace L. Chadwick, 5

(ASCE) PUBLIC AFFAIRS FORUM
Where Is Engineering Education Today? —From the Educator's Viewpoint, Gene M. Nordby, 129

(ASCE) TECHNICAL PUBLICATIONS
The Economics of ASCE Technical Publications, William H. Wisely, 720

ANALOGS
Analogue Procedure for Determination of Virtual Mass, O. C. Zienkiewicz and B. Nath, 193
Men, Models, Methods, and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555

ANTENNAS
Arecibo Radar-Radio Telescope—Design and Construction, Thomas C. Kavanagh and David H. H. Tung, 625

AQUEDUCTS
California—California Water Project, Power Plans and Demands, Alfred R. Golze, 100
California—Steel pipe for South Bay Aqueduct, Alfred R. Golze, 166

ARCH DAMS
Colorado—Reclamation Firsts: Underground Power Plant at Morrow Point Dam, B. P. Bellport, 105
Design of Karadj Arch Dam, Jan A. Veltrop and Roman P. Wengler, 213
Development of Arch Action in Arch Dams, K. V. Swaminathan, 135
Measuring Structural Behavior of Glen Canyon Dam, Joe T. Richardson, 410
Seismic Study of Arch Dams, J. Laginha Serafim and J. Oliveira Pedro, 590

ARCHES
Missouri—St. Louis Steel Arch, Symbol of the Spirit of the Pioneers, 594
Research in Soil Structure Interaction, William J. Flathau, 502

ARCTIC
Arctic Siting and Surveying, Max O. Laird, 829

ASPHALTS
Barge Decks Resurfaced with Asphalts, William P. Helbock, 627

AUTOMOBILES
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205

BACKWASHING
Filtration Through Size-Graded Media, Ernest W. J. Diaper and Kenneth J. Ives, 771

BARGES
Barge Decks Resurfaced with Asphalts, William P. Helbock, 627

BEAM-COLUMNS
Experimental Rotation of Steel Beam-Columns, Giuliano Augusti, 291
Plastic Behavior of Tubular Beam Columns, Timothy J. Dwyer and Theodore V. Galambos, 537
Random Vibration of a Beam Column, Masanobu Shinozuka and L. Henry, 611

BEAMS (Structural)
Anchor Zone Stresses in Prestressed Concrete Beams, Pijush Kanti Som and Kalyanmay Ghosh, 94
Coupled Vibrations of Thin-Walled Elastic Bars, Wai Keung Tso, 175
Discrete Dynamic Models for Elasto-Inelastic Beams, R. Wen and T. Toridis, 187
Dynamic Response of Beam on Visco-elastic Subgrade, Jan D. Achenbach and Chin-teh Sun, 602
Effect of Large Alternating Strains on Steel Beams, Vitelmo V. Bertero and Egor P. Popov, 481
Flexural Strength of Steel and Concrete Composite Beams, Roger G. Slutter and George C. Driscoll, 823
Inelastic Steel Beams Under Uniform Moment, Maxwell G. Lay and Theodore V. Galambos, 832
Influence Functions for Beams on Elastic Foundations, Alexander Dodge, 102
Influence Lines for Beams on Elastic Foundations, K. T. Sundara Raja Iyengar and S. Anantharamu, 643
On Composite Beams, William R. Spillers, 836
On the Shock Response of Inelastic Beams, Kenneth E. Blanchard and Albert B. Shultz, 655
Operational Method for Continuous Beams, Bennosuke Tanimoto, 423

BEAMS Continued
Optimum Synthesis of Prestressed Structures, George I. N. Rozvany, 157
Plastic Analysis and Design of Non-Prismatic Members, Bruce G. Rogers and William H. Munse, Jr., 366
Restraints Against Elastic Lateral Buckling, Lewis C. Schmidt, 819
Shock Response of a Simple Beam on Nonlinear Supports, Theodore R. Tauchert and Robert S. Ayre, 862
Wood Beams Prestressed with Bonded Tension Elements, John Peterson, 379

BEARING CAPACITY
Approximation for Terzaghi's Bearing Capacity Factors, Raymond J. Krizek, 55
Pore Pressure and Bearing Capacity of Layered Clays, T. Cameron Kenney, 462

BIDS
Changed Conditions Clause in Construction Contracts, Robert F. Borg, 118

BLASTING
Crushable Materials for Structural Blast Shields, Martin A. Salmon and Carl J. Costantino, 191
Dynamic Structural Analysis with Short Time History, George L. Henderson, 253

BOLTS
Analysis of Bolted Butt Joints, John W. Fisher and John L. Rumpf, 738
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854
Calibration Tests of A490 High-Strength Bolts, Gordon H. Sterling, Emile W. J. Troup, Eugene Chesson, Jr., and John W. Fisher, 583
Criteria for Designing Bearing-Type Bolted Joints, John W. Fisher and Lynn S. Beedle, 751
High Strength Bolted Moment Connections, Richard T. Douty and William McGuire, 565
High-Strength Bolts Subjected to Tension and Shear, Eugene Chesson, Jr., Norberto L. Faustino, and William H. Munse, 588
Misalinement in Bolted Joints, Desi D. Vasarhelyi and William N. Chang, 460
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766

BRACING
Inelastic Steel Beams Under Uniform Moment, Maxwell G. Lay and Theodore V. Galambos, 832

BRIDGES (Structures)
Bolted Bridge Behavior During Erection and Service, Eugene Chesson, Jr., 120
Effect of Floods and Obsolescence on Bridge Life, Manuel A. Benson and N. C. Matalas, 830
Effect of Spur Dikes on Flow Through Contractions, E. Robert Hedman, 722
New York—Linseed-Oil Protection for New York State Thruway Bridges, Robert J. Walsh, 457

BUCKLING
Analysis of an Inelastic Column, John V. Huddleston, 787
Buckling Behavior of an Inelastic Column, Allan J. Malvick and Lawrence H. N. Lee, 692
Buckling Loads for Elastically Supported Struts, A. Raymond Toakley, 168
Buckling of Long Unsupported Timber Piles, Earle J. Klohn and G. T. Hughes, 235
Buckling of Multistory Buildings, John E. Goldberg, 60
Buckling of Three-Legged Columns with Batten Bracing, Jorge Y. Tamayo and Morris Ojalvo, 419
Design of Aluminum Tubular Members, John W. Clark and Richard L. Rolf, 271
Experimental Rotation of Steel Beam-Columns, Giuliano Augusti, 291
Face-Wrinkling Mode of Buckling of Sandwich Panels, Billy J. Harris and W. C. Crisman, 575
Flange Local Buckling in Wide-Flange Shapes, Maxwell G. Lay, 806
Inelastic Buckling Gradient, Bruce G. Johnston, 331
Inelastic Buckling of Steel Frames, Le-Wu Lu, 870
Inelastic Frame Buckling, Fred Moses, 153
Large Deflection of Heated Plates, Marion W. Wilcox and Lewis E. Clemmer, 181
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279
Restraints Against Elastic Lateral Buckling, Lewis C. Schmidt, 819
Stability of Structures with Small Imperfections, John Roorda, 63
Torsional-Flexural Buckling of Thin-Walled Members, Alexander Chajes and George Winter, 815
Vibrations and Stability of Buckled Panels, Yao W. Chang and Ernest F. Masur, 755

BUILDING CODES
Charts Simplify Reinforced-Masonry Design, J. N. Littlefield, 485
Welding Codes Updated, addenda issued to AWS Building Code and Bridge Specification, 349

BUILDINGS
Apollo-A Trip to the Moon—Symposium, (2) Design of the Vertical Assembly Building, Anton Tedesko, 53
Apollo-A Trip to the Moon—Symposium, (3) Vertical Assembly Building—Design of Foundations, Philip C. Rutledge, 67
Apollo-A Trip to the Moon—Symposium, (1) Vertical Assembly Building—Project Description, Organization, and Procedures, William D. Alexander, 11
Buckling of Multistory Buildings, John E. Goldberg, 60
Combination Water Systems for High-Rise Buildings, G. D. Testin, 232
Concrete Need Not Hibernate, Howard C. Wiechman, 653
Florida—Liaison Insures Quality Control for Vehicle Assembly Building at Cape Kennedy, Charles I. Orr, 773
Foundations on Fissured Limestone—How They Were Selected, Henry M. Reitz, 543
Jackson, Miss., in 2039 A.D., 252
Structural Maintenance—the Third Element in the Structural Engineer's Professional Package, T. C. Kavanagh and S. M. Johnson, 309
Thermal Stresses due to Unequal Thermal Coefficients of Concrete and Reinforcing Steel, T. A. Holm, 144

BUSES (Vehicles)
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205

CABLES
Arecibo Radar-Radio Telescope—Design and Construction, Thomas C. Kavanagh and David H. H. Tung, 625

CAISSONS
Sweden—Building Foundation Built as a Caisson for Port Storage in Stockholm, Hal W. Hunt, 39

CANALS
The Amazing Pennsylvania Canals, W. H. Shank, 57
Canal Discharge Measurements with Radioisotopes, Jack C. Schuster, 359
Capacity Tests in Large Concrete-Lined Canals, Paul J. Tilp, 846
Duplicate Locks for Illinois Waterway, William J. Santina and George B. Wesler, 159
Experiments on Small Streams in Alluvium, Peter Ackers, 373
Florida—The Cross-Florida Barge Canal Under Construction, F. O. Biehn, 371
Inland Water Transportation in Poland, Fryderick Tomala, 875
Nuclear Excavation of a Sea-Level Isthmian Canal, Luke J. Vortman, 209
Theoretical Aspects of Seepage from Open Channels, Herman Bouwer, 377

CAVITATION
Water Hammer Resulting from Cavitating Pumps, M. R. Carstens and T. W. Hagler, Jr., 277

CHANNELS (Waterways)
Areal Variations of Mean Annual Runoff, Allen G. Hely, 41
Critical Analysis of Open-Channel Resistance, Hunter Rouse, 851
Dispersion Measurement in Open Channels, Calvin C. Patterson and Earnest F. Gloyna, 46
Erosion and Deposition of Cohesive Soils, Emmanuel Partheniades, 319
Errors in Piezometric Measurement, William W. Emmett and James R. Wallace, 217
Hydraulic Studies of Jamaica Bay, Armando Balloffet and Arnold Kupferman, 255
European Concepts of Sediment Transportation, John L. Bogardi, 860
Influence of Soil Types on Stabilization of the Savannah River, William J. Wall, 717
Large-Scale Roughness in Open-Channel Flow, John B. Herbich and Sam Shulits, 386
Stability of Channels by Armorplating, Dasel E. Hallmark and George L. Smith, 796
Stabilizing the Lower Mississippi River, Ellsworth I. Davis and Ernest B. Lipscomb, 630

CIVIL DEFENSE
New Trends in Fallout Protection, Seymour Wengrovitz and Gordon W. Hirtle, 451

CLAY (Material)
Analysis of Clay Deformation As A Rate Process, Richard W. Christensen and Tien Hsing Wu, 334
Clay Mineralogical Aspects of the

CLAY Continued
Atterberg Limits, H. Bolton Seed, Richard J. Woodward and Raymond Lundgren, 285
Compressibility of Clay, Gerald A. Leonards and Adolph G. Altschaeffl, 303
Consolidation of Nonhomogeneous Clay Layers, Robert L. Schiffman and Robert E. Gibson, 659
Fundamental Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 531
In-Situ Strength Characteristics of Soft Clays, I. Noorany and H. Bolton Seed, 323
Interpretation of the Consolidation Test, Carl B. Crawford, 13
Measuring Instruments for Strutted Excavating, Lauritis Bjerrum, T. Cameron Kenney, and B. Kjaernsli, 568
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Pore Pressure and Bearing Capacity of Layered Clays, T. Cameron Kenney, 462
Radial Drainage Oedometer for Laminated Clays, D. H. Shields and P. W. Rowe, 339
Shear Strength of a Soil After Freezing and Thawing, Bengt B. Froms and Leslie Y. C. Yao, 375
Some Swelling Characteristics of Compacted Clays, James V. Parcher and Ping-Chuan Lin, 641

CLIMATOLOGY
Irrigation Planning Using Climatological Data, Edward H. Wiser, 849

COACHELLA VALLEY, CALIFORNIA
Tile Drainage Performance, Coachella Valley, California, Arthur F. Pillsbury, J. R. Spencer, William R. Johnston, and L. O. Weeks, 9

COEFFICIENTS
Flow Characteristics of PVC Sewer Pipe, Lawrence C. Neale and Robert E. Price, 840
Irrotational Flow Over Spillways of Finite Height, John J. Cassidy, 866
Large-Scale Roughness in Open-Channel Flow, John B. Herbich and Sam Shulits, 386
"Placed-Stone" Jetty, Stone-Weight Coefficients, Harold A. Kidby, Samuel B. Powell, and Arthur L. Roberts, 203

COLD-WEATHER CONSTRUCTION
Alaska—Plastic Insulation vs. Deep Trenching for Seldovia Water Mains, Frank Nyman, 207
Alaska—Utilities for a Relocated Town in Valdez, James W. Poirot, 173
Canada—Winnipeg Favors Utility Construction in Winter, W. S. Brock, 442
Concrete Need Not Hibernate, Howard C. Wiechman, 653
Do's and Don'ts of Cold-Weather Concreting, A. T. Hersey, 464
Utah—Lift Slabs (in Salt Lake City) Cast under Plastic Cover for Raising in Spring, Robert Sawyer, 454

COLLECTIVE BARGAINING
To Bargain or Not to Bargain, E. Lawrence Chandler, 492
Collective Bargaining for Municipal Engineers, Herman P. Zanoni, 577

COLORADO RIVER
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639
Future Quantity and Quality of Colorado River Water, Raymond A. Hill, 837

COLUMBIA RIVER
Flow Measurements at Columbia River Power Plants, Nicholas A. Dodge, 760

COLUMNS (Structural)
Analysis of an Inelastic Column, John V. Huddleston, 787
Behavior of Restrained Reinforced Concrete Columns, Edward O. Pfrang and Chester P. Siess, 341
Buckling Behavior of an Inelastic Column, Allan J. Malvick and Lawrence H. N. Lee, 692
Buckling of Long Unsupported Timber Piles, Earle J. Klohn and G. T. Hughes, 235
Buckling of Three-Legged Columns with Batten Bracing, Jorge Y. Tamayo and Morris Ojalvo, 419
Design of Footing for Exposed Exterior Column, Yin-chow Chang, 352
Inelastic Buckling Gradient, Bruce G. Johnston, 331
Predicting Structural Behavior Analytically, Edward O. Pfrang and Chester P. Siess, 289
Strength of Round Steel Columns, Theodore V. Galambos, 257
Torsional-Flexural Buckling of Thin-Walled Members, Alexander Chajes and George Winter, 815

COMPACTING
Shear Strength of a Soil After Freezing and Thawing, Bengt B. Broms and Leslie Y. C. Yao, 375
Soil Surface Compaction with a Foam-Type Explosive, L. J. Goodman, A. R.

COMPACTING Continued
Aidun, and C. S. Grove, Jr., 534

COMPACTION
Pore Water Pressures in Unsaturated Soils, Roy E. Olsen and Leonard J. Langfelder, 365

COMPOSITE CONSTRUCTION
Composite Design Cuts Cost of Small Warehouse, Edward B. Finkel, 469

COMPUTATION
Guide to Development and Use of Electronic Computer Programs: Introduction, Steven J. Fenves, 261
Interaction of Shear Walls and Frames, Fazlur R. Khan and John A. Sbarounis, 247

COMPUTERS
Analysis of Multicell Box Gates for Dry Docks, Mohamed Ali El-gaaly, 435
Challenge to Civil Engineering, Harvey Brooks, 344
CMP—As Complete Project Management, Burl W. Howard, 628
Computer Analysis of Overland Flow, James R. Morgali and Ray K. Linsley, 857
Computer Program for Leveling Resource Usage, Robert V. Galbreath, 596
Computer System Designed for Teaching and Structural Research at MIT, William A. Litle and Kenneth Reinschnidt, 542
Dynamic Structural Analysis with Short Time History, George L. Henderson, 253
Earthquake Response of Systems with Bilinear Hysteresis, Spiro S. Thomaides, 26
Electronics in Surveying, Edmond T. Miller, 307
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
Extending CPM for Multiform Project Time-Cost Curves, Walter L. Meyer and Louis R. Shaffer, 491
Finite Element Analysis of Axi-Symmetric Solids, Ray W. Clough and Yusef Rashid, 98
Florida—Criteria for Construction in Creating Another Cape Kennedy Colussus, George H. Kirkland, 694
Generalized Resection Method in Surveying, K. C. Chakko, 421
Ground-Water Models Solved by Digital Computer, Irwin Remson, Charles A. Appel, and Raymond A. Webster, 855
Guide to Development and Use of Electronic Computer Programs: Computers and Programming, Charles L. Miller and Steven J. Fenves, 3
Guide to Development and Use of Electronic Computer Programs: Introduction, Steven J. Fenves, 261
Guide to Development and Use of Electronic Computer Programs: Program Planning, Steven J. Fenves, 15
Hydraulic Studies of Jamaica Bay, Armando Balloffet and Arnold Kupferman, 255
Men, Models, Methods, and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555
Multivariate Technique for Synthetic Hydrology, Myron B. Fiering, 107
Numerical Solution to a Dispersion Equation, Nobuhiro Yotsukura and Myron B. Fiering, 444
Optimum Structural Design Using Linear Programming, Fred Moses, 171
Shock Response of a Simple Beam on Nonlinear Supports, Theodore R. Tauchert and Robert S. Ayre, 862
Solution of Highly Curvilinear Gravity Flows, Theodor S. Strelkoff, 355
STADIA—an Automatic Data Input Assembler for Topographic Surveys, Paul D. Spindel, 580
Steel Fabrication Drawings by Computer, Alfred H. Palmer and Herbert T. Blomquist, 116
Vertical Drainage of an Unsaturated Soil, Irwin Remson, Ronald L. Drake, Samuel S. McNeary, and Edward M. Wallo, 223

CONCRETE
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634
Anchor Zone Stresses in Prestressed Concrete Beams, Pijushkanti Som and Kalyanmay Ghosh, 94
Bellevile Locks on the Ohio River, R. B. Howard, 621
Capacity Tests in Large Concrete-Lined Canals, Paul J. Tilp, 846
Cellular Concrete Block Revetment, D. A. Parsons and R. P. Apmann, 128
Concrete Need Not Hibernate, Howard C. Wiechman, 653
Do's and Don'ts of Cold-Weather Concreting, A. T. Hersey, 464
Interaction of Shear Walls and Frames, Fazlur R. Khan and John A. Sbarounis, 247
Lateral Pressure of Concrete on Formwork, R. L. Peurifoy, 679
New York—Linseed-Oil Protection

CONCRETE Continued
for New York State Thruway Bridges, Robert J. Walsh, 457
Understanding the Corrosion Resistance of Concrete Pipe, John A. Shaw, 396

CONNECTORS
Flexural Strength of Steel and Concrete Composite Beams, Roger G. Slutter and George C. Driscoll, 823

CONSOLIDATION
Consolidation Testing with Back Pressure, John Lowe, III, Philip F. Zaccheo, and Harvey S. Feldman, 121
Differential Settlement at Selfridge Air Force Base, George B. Wallace and William C. Otto, 70
Engineering Measurements for Port Allen Lock, R. I. Kaufman and W. C. Sherman, Jr., 29
Interpretation of the Consolidation Test, Carl B. Crawford, 13

CONSTRUCTION
Arecibo Radar-Radio Telescope—Design and Construction, Thomas C. Kavanagh and David H. H. Tung, 625
Bellevile Locks on the Ohio River, R. B. Howard, 621
Changed Conditions Clause in Construction Contracts, Robert F. Borg, 118
CMP—As Complete Project Management, Burl W. Howard, 628
Computer Program for Leveling Resource Usage, Robert V. Galbreath, 596
Contractor's View on Unlined Tunnels, Alfred M. Petrofsky, 43
Designing Specifications—A Challenge, Edward A. Abdun-Nur, 604
Design of Karadj Arch Dam, Jan A. Veltrop and Roman P. Wengler, 213
Extending CPM for Multiform Project Time-Cost Curves, Walter L. Meyer and Louis R. Shaffer, 491
How to Improve Quality Control of Construction, Hal W. Hunt, 698
Improved Inspection on the West Coast, John Steinbrugge, 613
Installation Procedure for Hot Metal Facility, L. Earl Tabler, Jr., 7
Machine Tunneling on Missouri River Dams, Lloyd B. Underwood, 780
Mathematical Method for Blending Aggregates, Donald L. Neumann, 64
New Type Weir Construction for Small Watersheds, Neal E. Minshall and Ralph G. Spomer, 189
Preloading Results in Tank Foundation Economies, Louis J. Goodman and Norbert E. Faltyn, 843
Quality Control in Construction, W. O. Hiltabidle, Jr., Bradford N. Clark, Charles E. Schaffner, John Nelson Linn, Ralph E. De Simone, Arnold H. Vollmer, Elmer B. Isaak, Leslie D. Long, Richard Q. Praeger, Hal W. Hunt, 660
Quality Controls for Steel Construction, Milton Brumer, 608
Rock Trap Experience in Unlined Tunnels, John J. Mattimoe, E. Roy Tinney, and W. Weston Wolcott, 33
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, H. E. Dann, W. P. Hartwig, and J. R. Hunter, 17
Unlined Tunnels of the Southern California Edison Company, Ralph W. Spencer, Bruce R. Laverty, and Dean A. Barber, 73

CONSTRUCTION EQUIPMENT
Alabama—Paddle Wheels for Traction in a Swamp, 691

CONSTRUCTION INDUSTRY
How to Inspect Construction, Benjamin P. Cohen, 591

CONSTRUCTION MATERIALS
Designing Specifications—A Challenge, Edward A. Abdun-Nur, 604

CONSULTANTS
The American Consulting Engineer Abroad, Edward J. Quirin, 161
Starting Your Own Consulting Practice—Business and Finance, Joseph S. Ward, 61

CONTRACTS
The American Consulting Engineer Abroad, Edward J. Quirin, 161
Changed Conditions Clause in Construction Contracts, Robert F. Borg, 118
Legal Aspects of Quality Control, Robert B. Jarvis, 600

CORROSION
Operating a Sea Water Barrier Project, Arthur E. Bruington and Frederick D. Seares, 636
Understanding and Controlling Corrosion, Harry Neugold, Jr., 239
Understanding the Corrosion Resistance of Concrete Pipe, John A. Shaw, 396

COSTA RICA
Seismic Study of Arch Dams, J. Laginha Serafim and J. Oliveira Pedro, 590

COSTS
Composite Design Cuts Cost of Small Warehouse, Edward B. Finkel, 469
Effect of Irrigation Method on Water Conservation, Jack Keller, 834
Graphical Method for Discounting Future Benefits in Feasibility Studies, George E. Ribble, 662
Latest Developments in Transporting Coal by Rail, Richard N. Bergstrom and Kenneth W. Hamming, 681
Operating a Sea Water Barrier Project, Arthur E. Bruington and Frederick D. Seares, 636

CRITICAL PATH METHOD
CMP—As Complete Project Management, Burl W. Howard, 628
Colorado—Denver's Metro Waste Treatment Plant, William L. Bredar, 687
Extending CPM for Multiform Project Time-Cost Curves, Walter L. Meyer and Louis R. Shaffer, 491
Installation Procedure for Hot Metal Facility, L. Earl Tabler, Jr., 7

CULVERTS
Colorado—70-ft Underpasses of Corrugated Steel Pipe for Broadmoor Hotel, Colorado Springs, Nick Pinello, 638

DAMAGE
Field Observations of Structures Damaged by Settlement, Donald McKinley, 316

DAMS
California—California Water Project, Power Plans and Demands, Alfred R. Golze, 100
Canada—Hydro Development of the Manicouagan and Outardes Rivers in Quebec, Benoit Baribeau, 744
Irrigation in India: Past and Present, Asit K. Biswas, 523
Machine Tunneling on Missouri River Dams, Lloyd B. Underwood, 780
North Carolina—Controlling Leakage from Cowans Ford Dam, Joe T. Moore, 357
Spillway Discharge Coefficients for Rock Island Dam, Claud C. Lomax, 539
Tenn.—Nickajack Dam, a Replacement for Hales Bar, Floyd P. Lacy, Jr. and Ward W. Engle, 391

DEFLECTION
Deflections of Multiple-Panel Reinforced Concrete Floor Slabs, Mortimer D. Vanderbilt, Mete A. Sozen, and Chester P. Siess, 769
Large Deflection of Heated Plates, Marion W. Wilcox and Lewis E. Clemmer, 181
Shakedown Analysis of Some Typical One-Story Bents, Egor P. Popov and Eric Becker, 186
Tilt and Deflections of Tapered Polygonal Towers, Ralph J. Pschunder, 143

DEFORMATION
Complementary Energy Method for Finite Deformations, Charles Libove, 414
Elastic Loading of High Pressure Cylinders, Raymond Epain and Boris Vodar, 775
Large Strain Analysis and Stresses in Linear Materials, August J. Durelli and Alfred P. Mulzet, 139
Measuring Instruments for Strutted Excavating, Lauritis Bjerrum, T. Cameron Kenney, and B. Kjaernsli, 568
Studies of the Ductility of Steel Structures, Theodore V. Galambos and Maxwell G. Lay, 812

DESALTING
Transitory Irrigation Developments, Raymond A. Hill, 211

DESIGN
Direct Design of Framed Structures, John F. Brotchie, 37
Evaluation of Two Aerated Lagoons, Ross E. McKinney and Henry H. Benjes, Jr., 842
Influence Lines for Beams on Elastic Foundations, K. T. Sundara Raja Iyengar and S. Anantharamu, 643

DIKES
Development of Ground Water in Hawaii, Leslie J. Watson, 401
Effect of Spur Dikes on Flow Through Contractions, E. Robert Hedman, 722
Foreshore Protection, Lower Mississippi River, Rudolf Hertzberg, 573
Influence of Soil Types on Stabilization of the Savannah River, William J. Wall, 717

DIMENSIONAL ANALYSIS
Heat Analysis—A Tensoral-Dimensional Approach, Sidney F. Borg, 825

DISPERSIONS
Canal Discharge Measurements with Radioisotopes, Jack C. Schuster, 359
Dispersion and Adsorption in Porous Media Flow, Robert B. Banks, and Iqbal Ali, 690
Dispersion Measurement in Open

DISPERSIONS Continued
Channels, Calvin C. Patterson and Earnest F. Gloyna, 46
Numerical Solution to a Dispersion Equation, Nobuhiro Yotsukura and Myron B. Fiering, 444
Wind Driven Water Currents, W. Douglas Baines and Douglas J. Knapp, 788

DOCKS
Barge Docks for Inland Waterways, William L. Horstman, 703
Chile—Seabees Give Technical Assistance in Chile, Leroy D. Lawson, 110

DOMES
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279
Texas—Unusual Dome Awaits Baseball Season in Houston, Louis O. Bass, 47
Wind Loads on Basic Dome Shapes, F. J. Maher, 103

DRAINAGE
Areal Variations of Mean Annual Runoff, Allen G. Hely, 41
Forest Drainage Research in the Coastal Plain, Ralph A. Klawitter and Cortland E. Young, Jr., 736
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364
Inflow Hydrographs from Large Unconfined Aquifers, Hassan Ali Ibrahim and Wilfried Brutsaert, 864
Initial Motion Problem in Porous Media, James A. Ligget and Christos Hadjitheodorou, 408
Rice Irrigation, Lee Chow, 724
Sample Size Estimates in Permeability Studies, Lyman S. Willardson and Rex L. Hurst, 777
Texas—Houston Airport, a Study in Engineer-Contractor Harmony, H. O. Fischer, 553
Tile Drainage Performance, Coachella Valley, California, Arthur F. Pillsbury, J. R. Spencer, William R. Johnston, and L. O. Weeks, 9
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham, and E. Robert Baumann, 514
Vertical Drainage of an Unsaturated Soil, Irwin Remson, Ronald L. Drake, Samuel S. McNeary, and Edward M. Wallo, 223

EARTH DAMS
Greece—A Concrete Cutoff Wall for Earthfill Peneos Dam, Th. C. Gofas, 529

EARTH PRESSURE
Earth Pressures for Bilinear Backfill Surface, B. Satyanarayana, 295

EARTHQUAKES
Alaska—Vertical Forces in Earthquake of March 1964, Harvey P. Pittelko, 49
Earthquake Response of Systems with Bilinear Hysteresis, Spiro S. Thomaides, 26
Earthquake Response of a Yielding Structure, Paul C. Jennings, 453
Earthquake Stability of Slopes of Cohesionless Soils, H. Bolton Seed and Richard E. Goodman, 466
Probabilistic Design to Resist Earthquakes, Emilio Rosenblueth, 112
Random Vibration of a Beam Column, Masanobu Shinozuka and L. Henry, 611
Seismic Study of Arch Dams, J. Laginha Serafim and J. Oliveira Pedro, 590
Studies of the Ductility of Steel Structures, Theodore V. Galambos and Maxwell G. Lay, 812

EARTHWORK
Alabama—Paddle Wheels for Traction in a Swamp, 691

ECONOMIC EVALUATIONS
Graphical Method for Discounting Future Benefits in Feasibility Studies, George E. Ribble, 662

ECONOMICS
Effect of Floods and Obsolescence on Bridge Life, Manuel A. Benson and N. C. Matalas, 830
Effect of Irrigation Method on Water Conservation, Jack Keller, 834
Inland Water Transportation in Poland, Fryderick Tomala, 875

EDUCATION
The Case of the Missing Curriculum, Kenneth S. Curtis, 700
Continuing Education, William H. Wisely, 92
Educational Requirements for Water Resource Engineers, Alfred R. Golzé, 606
Education for Sanitary Engineers, E. Sherman Chase, 301
Engineering Education—From the Practitioner's Viewpoint, Joseph S. Ward, 147
Improved Inspection on the West Coast, John Steinbrugge, 613
Ph.D. and P.E. in Civil Engineering Education, Ross E. McKinney, 219
Teaching Engineering Attitude to

EDUCATION Continued
Students, Malcolm S. Gregory, 361
Trend in Water Resources Education, Carl E. Kindsvater, 369
Where Is Engineering Education Today? —from the Educator's Viewpoint, Gene M. Nordby, 129

EGYPT
Natural Drainage of River Valleys, Hammad Y. Hammad, 227

ELASTICITY
Analysis Comparisons for Single Curved Shell Roofs, Paul E. Mast, 790
Coupled Vibrations of Thin-Walled Elastic Bars, Wai Keung Tso, 175
Elastic Plates Subjected to Moving Heat Sources, Ardeshir Jahanshahi, 450
Elastic Stability of Radially Nonhomogeneous Rings, S. Russell Keim, 786
Finite Element Analysis of Axi-Symmetric Solids, Ray W. Clough and Yusef Rashid, 98
Restraints Against Elastic Lateral Buckling, Lewis C. Schmidt, 819
Spherical Elastic Plastic Shock Propagation, Morton B. Friedman, Hans H. Bleich, and Raymond Parnes, 76
Stability of Structures with Small Imperfections, John Roorda, 63
Stresses in a Uniformly Loaded Two-Layer Circular Plate, Martin A. Goldberg, Malcolm Newman, and Marvin J. Forray, 652

EMPLOYMENT
Fringe Benefits in Civil Engineering Compensation, Clair A. Hill, 432

ENERGY
Complementary Energy Theorem for Symmetric Shells, Charles Libove, 623

ENGINEERING MECHANICS
Analysis of Contained Plastic Flow in Plane Solids, Alfredo H. S. Ang and Goin N. Harper, 304
Analysis of an Inelastic Column, John V. Huddleston, 787
Bending of Circular Sandwich Plates, Jao-Shiun Kao, 438
Buckling Behavior of an Inelastic Column, Allan J. Malvick and Lawrence H. N. Lee, 692
Buckling Loads for Elastically Supported Struts, A. Raymond Toakley, 168
Buckling of Multistory Buildings, John E. Goldberg, 60
Calculating Deflections of a Partially Collapsed Frame, Nicholas Perrone and Michael C. Soteriades, 383
Complementary Energy Method for Finite Deformations, Charles Libove, 414
Complementary Energy Theorem for Symmetric Shells, Charles Libove, 623
Coupled Vibrations of Thin-Walled Elastic Bars, Wai Keung Tso, 175
Discrete Dynamic Models for Elasto-Inelastic Beams, R. Wen and T. Toridis, 187
Dynamic Changes of Mode in Rigid-Plastic Structures, Barry Rawlings, 176
Dynamic Response of Beam on Viscoelastic Subgrade, Jan D. Achenbach and Chin-teh Sun, 602
Dynamic Response of a Tube Under Moving Pressure, Sing-chih Tang, 730
Earthquake Response of a Yielding Structure, Paul C. Jennings, 453
Elastic Loading of High Pressure Cylinders, Raymond Epain and Boris Vodar, 775
Elastic Plates Subjected to Moving Heat Sources, Ardeshir Jahanshahi, 450
Elastic Stability of Radially Nonhomogeneous Rings, S. Russell Keim, 786
Elastostatic Problem of a Perforated Square Plate, Alois L. Schlack and Robert W. Little, 51
Face-Wrinkling Mode of Buckling of Sandwich Panels, Billy J. Harris and W. C. Crisman, 575
Finite Element Analysis of Axi-Symmetric Solids, Ray W. Clough and Yusef Rashid, 98
Finite Element Soultion for Axi-symmetrical Shells, Egor P. Popov, Joseph Penzien, and Zung-An Lu, 114
Grain Size and Loading Effects on Steel, Russel C. Jones and John A. Hribar, 56
Grid-Framework Method for Plates in Flexure, Alan L. Yettram and Husain M. Husain, 778
Heat Analysis—A Tensoral-Dimensional Approach, Sidney F. Borg, 825
Impulsive Loading Theorems for Rigid-Plastic Continua, John B. Martin, 746
An Inclined Plume, Garth S. Harris, 416
Inelastic Buckling Gradient, Bruce G. Johnston, 331
Irrotational Flow Over Spillways of Finite Height, John J. Cassidy, 866
Large Deflection of Heated Plates, Marion W. Wilcox and Lewis E. Clemmer, 181
Large Strain Analysis and Stresses in Linear Materials, August J. Durelli and Alfred P. Mulzet, 139
A Method to Increase the Accuracy of Moiré Method, 251
Model for Wave Motions in Axi-

ENGINEERING MECHANICS Continued
Symmetric Solids, Alfredo H.-S. Ang and Johann H. Rainer, 266
Network Analysis of Structures, Frank L. Di Maggio and William R. Spillers, 122
Non-Newtonian Flows—Their Value in Civil Engineering, George Bugliarello, 509
On the Shock Response of Inelastic Beams, Kenneth E. Blanchard and Albert B. Schultz, 655
Probabilistic Design to Resist Earthquakes, Emilio Rosenblueth, 112
Probability of Structural Failure Under Random Loading, Masanobu Shinozuka, 165
Random Vibrations of a Beam Column, Masanobu Shinozuka and L. Henry, 611
Response of a Cylindrical Shell to an Elastic Wave, Michael J. Forrestal, Dronnadula V. Reddy, and George Herrmann, 52
Restraints Against Elastic Lateral Buckling, Lewis C. Schmidt, 819
Shock Response of a Simple Beam on Nonlinear Supports, Theodore R. Tauchert and Robert S. Ayre, 862
Slow Viscous Flow of an Incompressible Suspension, Gerhard Oertel, 494
Solution of Highly Curvilinear Gravity Flows, Theodor S. Strelkoff, 355
Spherical Elastic Plastic Shock Propagation, Morton B. Friedman, Hans H. Bleich, and Raymond Parnes, 76
Stability of Structures with Small Imperfections, John Roorda, 63
Stochastic Model for Predicting Subsidence, Arnold L. Sweet and John L. Bogdanoff, 59
Stresses in a Uniformly Loaded Two-Layer Circular Plate, Martin A. Goldberg, Malcolm Newman, and Marvin J. Forray, 652
Stresses in Hyperboloids under Edge Loadings, David G. Elms, David P. Billington, and Robert Mark, 498
A Study of Mechanisms with Application to Frames, Jacques E. Benveniste, 446
Thermal-Shock Effects on a Space Vehicle, Lewis Li-Tang Au and Donald J. Trent, 525
Two Degree-of-Freedom Elastoplastic Response to a Step Velocity Pulse, Robert H. Anderson, 581
Validity of a Stochastic Model for Predicting Subsidence, Arnold L. Sweet, 783
Vibrations and Stability of Buckled Panels, Yao W. Chang and Ernest F. Masur, 755

ENGINEERS
Challenge to Civil Engineering, Harvey Brooks, 344
Educational Requirements for Water Resource Engineers, Alfred R. Golzé, 606
Education for Sanitary Engineers, E. Sherman Chase, 301
Trend in Water Resources Education, Carl E. Kindsvater, 369

ENVIRONMENTAL ENGINEERING
Challenge to Civil Engineering, Harvey Brooks, 344
Closed Ecological Systems, William J. Oswald, Clarence G. Golueke, and D. O. Horning, 868
Environmental Effects of Flood Plain Regulations, Eugene W. Weber and Walter G. Sutton, 805

EPOXY RESINS
Photosensitive Plastics Extend the Range of Photoelastic Stress Studies, John P. Cook, 711

EROSION
Cellular Concrete Block Revetment, D. A. Parsons and R. P. Apmann, 128
Erosion and Deposition of Cohesive Soils, Emmanuel Partheniades, 319

ESTUARIES
Erosion and Deposition of Cohesive Soils, Emmanuel Partheniades, 319
Tidal Characteristics of Two Estuaries in Florida, William B. Stelzenmuller, 545

EVAPORATION
Evaporation Reduction on Large Reservoirs, C. Earl Israelsen and Vaughn E. Hansen, 784

EXCAVATION
Florida—The Cross-Florida Barge Canal Under Construction, F. O. Biehn, 371

EXPLOSIONS
Model for Wave Motions in Axi-Symmetric Solids, Alfredo H.-S. Ang and Johann H. Rainer, 266
Soil Surface Compaction with a Foam-Type Explosive, L. J. Goodman, A. R. Aidun, and C. S. Grove, Jr., 534

FAILURE
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279

FAILURE Continued
Washington—Legacy of Galloping Gertie (Tacoma Narrows Bridge), Robert Goller, 704

FILTERS (Fluid)
Filtration Through Size-Graded Media, Ernest W. J. Diaper and Kenneth J. Ives, 771

FILTRATION
Design Aspects of Lompoc Water Treatment Plant, Charles H. Lawrance, 275
Filtration Through Size-Graded Media, Ernest W. J. Diaper and Kenneth J. Ives, 771
Theory of Water Filtration, Thomas R. Camp, 1
Turbulent Flow in Porous Media, J. C. Ward, 664

FINANCING
Financing Future Intercity Transportation Systems, Ronald W. Pulling, 817

FIRE PROTECTION
Prestressed Lift Slabs Withstand Fire, G. E. Troxell, 762

FLOOD CONTROL
Are Flood-Plain Regulations Sound?, C. J. Posey, 417
East Pakistan—Master Plan for Water and Power Development, Ernest M. Bowles, 483

FLOODS
Barge Docks for Inland Waterways, William L. Horstman, 703
Effect of Floods and Obsolescence on Bridge Life, Manuel A. Benson and N. C. Matalas, 830
Environmental Effects of Flood Plain Regulations, Eugene W. Weber and Walter G. Sutton, 805
Sequential Generation of Rainfall and Runoff Data, Ven Te Chow and S. Ramaseshan, 696
Tacitly Maximized Small Watershed Flood Estimates, Brian M. Reich and Lourens A. V. Hiemstra, 753

FLOORS
Buckling of Multistory Buildings, John E. Goldberg, 60

FLUMES
Mounting Plate Glass in Sides of Flumes and Tanks, Elton F. Daly, 586

FLY ASH
Air Pollution from Incinerators—Causes and Cures, Leo P. Flood, 734

FOLDED PLATES
Analysis Comparisons for Single Curved Shell Roofs, Paul E. Mast, 790

FOOTINGS
Approximation for Terzaghi's Bearing Capacity Factors, Raymond J. Krizek, 55
Designing Isolated Footings against Overturning, Donald G. Newnan, 672
Design of Footing for Exposed Exterior Column, Yin-chow Chang, 352

FORECASTING
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
Financing Future Intercity Transportation Systems, Ronald W. Pulling, 817
Graphical Method for Discounting Future Benefits in Feasibility Studies, George E. Ribble, 662
River Flood Flows, Forecasts and Probabilities, Michael C. Quick, 546

FOREIGN ENGINEERING
The American Consulting Engineer Abroad, Edward J. Quirin, 161
Canada—Hydro Development of the Manicouagan and Outardes Rivers in Quebec, Benoit Baribeau, 744
Canada—Toronto Office-Building Complex Breaks Records, John L. Kellermann, 368
Chile—Seabees Give Technical Assistance in Chile, Leroy D. Lawson, 110
East Pakistan—Master Plan for Water and Power Development, Ernest M. Bowles, 483
Inland Water Transportation in Poland, Fryderick Tomala, 875
Military Engineering in Vietnam, Peter A. Corradi, 617
The Netherlands—Rotterdam's Rapid Transit Tunnel, Ir. G. Plantema, 520
A New and Better Foreign Technical Assistance Program, John S. Hale, 439
Water for the World, M. D. Morris, William E. Wood, James J. Geraghty, James Gould, Gordon R. Williams, Donald F. Othmer, Donald R. Lueder, Malcolm Pirnie, Jr., and Arthur C. Ford, 802
Water Supply for Saigon, Walter T. McPhee, 426

FORMWORK (Construction)
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634
Lateral Pressure of Concrete on Formwork, R. L. Peurifoy, 679

FOUNDATIONS
Apollo-A Trip to the Moon—Symposium, (2) Design of the Vertical Assembly Building, Anton Tedesko, 53
Apollo-A Trip to the Moon—Symposium, (3) Vertical Assembly Building—Design of Foundations, Philip C. Rutledge, 67
Apollo-A Trip to the Moon—Symposium, (1) Vertical Assembly Building—Project Description, Organization, and Procedures, William D. Alexander, 11
Consolidation of Nonhomogeneous Clay Layers, Robert L. Schiffman and Robert E. Gibson, 659
Designing Isolated Footings Against Overturning, Donald G. Newnan, 672
Design of Footing for Exposed Exterior Column, Yin-chow Chang, 352
Design of Karadj Arch Dam, Jan A. Veltrop and Roman P. Wengler, 213
Design of Laterally Loaded Piles, Bengt B. Broms, 389
Development of Arch Action in Arch Dams, K. V. Swaminathan, 135
Differential Settlement at Selfridge Air Force Base, George B. Wallace and William C. Otto, 70
Dynamic Response of Beam on Viscoelastic Subgrade, Jan D. Achenbach and Chin-teh Sun, 602
Engineering Measurements for Port Allen Lock, R. I. Kaufman and W. C. Sherman, Jr., 29
Field Observation of Structures Damaged by Settlement, Donald McKinley, 316
Foundations on Fissured Limestone—How They Were Selected, Henry M. Reitz, 543
Preloading Results in Tank Foundation Economies, Louis J. Goodman and Norbert E. Faltyn, 843
Influence Functions for Beams on Elastic Foundations, Alexander Dodge, 102
Interaction of Shear Walls and Frames, Fazlur R. Khan and John A. Sbarounis, 247
Pile and Pier Foundations, Ralph B. Peck, 224
Settlement of Buildings on the MIT Campus, Harry M. Horn and T. William Lambe, 221
Shallow Foundations, George G. Meyerhof, 441
State-of-the-Art of Floating Foundations, Hugh Q. Golder, 327
Sweden—Building foundation built as a caisson for port storage in Stockholm, Hal W. Hunt, 39
Tolerance of Structures to Settlement, Jacob Feld, 398
Waterproofing Below the Ground Line, Thaddeus R. L. Lazarr, 400

FRAMES
Direct Design of Framed Structures, John F. Brotchie, 37
Frames of Solid Bars of Varying Cross Sections, Edward J. Krynicki and Zbigniew E. Mazurkiewicz, 716
Inelastic Buckling of Steel Frames, Le-Wu Lu, 870
Inelastic Frame Buckling, Fred Moses, 153
Interaction of Shear Walls and Frames, Fazlur R. Khan and John A. Sbarounis, 247
Loading Effects in Structural Steel Design, Richard N. Wright and William J. Hall, 195
Shakedown Analysis of Some Typical One-Story Bents, Egor P. Popov and Eric Becker, 186
A Study of Mechanisms with Application to Frames, Jacques E. Benveniste, 446
Welded Connections for Space Frame Joints, Robert H. Goldsmith, 712

FRINGE BENEFITS
Fringe Benefits in Civil Engineering Compensation, Clair A. Hill, 432

GAGES
County Rain-Gage Network Useful in Design, Alfred R. Pagan and Ronald Rothenberg, 269

GAS STORAGE
Storage Containers for Liquefied Natural Gas, P. J. Anderson and A. R. Khan, 516

GATES
Analysis of Multicell Box Gates for Dry Docks, Mohamed Ali El-gaaly, 435

GEOLOGY
Contractor's View on Unlined Tunnels, Alfred M. Petrofsky, 43
Machine Tunneling on Missouri River Dams, Lloyd B. Underwood, 780

GLUING
The Prestressed Glued Joint for Steel Connections, George Kostro, 294

GRAPHS (Charts)
Influence Lines for Beams on Elastic Foundations, K. T. Sundara Raja Iyengar and S. Anantharamu, 643

GREAT LAKES
Vertical Control on the Great Lakes, Gilbert E. Ropes, 561

GROUND WATER
Areal Variations of Mean Annual Runoff, Allen G. Hely, 41
Development of Ground Water in Hawaii, Leslie J. Watson, 401
Ground-Water Models Solved by Digital Computer, Irwin Remson, Charles A. Appel, and Raymond A. Webster, 855
Inflow Hydrographs from Large Unconfined Aquifers, Hassan Ali Ibrahim and Wilfried Brutsaert, 864
Salt-Water Interface Near a Fresh-Water Canal, Norbert L. Ackermann and Pachern Sridurongkatum, 381
Tile Drainage Performance, Coachella Valley, California, Arthur F. Pillsbury, J. R. Spencer, William R. Johnston, and L. O. Weeks, 9
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham, and E. Robert Baumann, 514
Water for the World, M. D. Morris, William E. Wood, James J. Geraghty, James Gould, Gordon R. Williams, Donald F. Othmer, Donald R. Lueder, Malcolm Pirnie, Jr., and Arthur C. Ford, 802

GROUTING
Design of Karadj Arch Dam, Jan A. Veltrop and Roman P. Wengler, 213
Foundations on Fissured Limestone—How They Were Selected, Henry M. Reitz, 543
North Carolina—Controlling Leakage from Cowans Ford Dam, Joe T. Moore, 357

HARBOR FACILITIES
Sweden—Building Foundation Built as a Caisson for Port Storage in Stockholm, Hal W. Hunt, 39

HARBORS
Functional Planning of Bulk Material Ports, Leonard S. Oberman, 88
"Placed-Stone" Jetty, Stone-Weight Coefficients, Harold A. Kidby, Samuel B. Powell, and Arthur L. Roberts, 203
The Structural Action of Pile Cluster Dolphins, David G. Elms and Werner E. Schmid, 816
Wave-Induced Oscillations in Harbors, Frederic Raichlen and Arthur T. Ippen, 183

HIGH-STRENGTH STEELS
Wood Beams Prestressed with Bonded Tension Elements, John Peterson, 379

HIGHWAYS
Effect of Floods and Obsolescence on Bridge Life, Manuel A. Benson and N. C. Matalas, 830
Electric Controls for Laying Smooth Pavements, R. L. Peurifoy, 757
Factors Considered in Urban Transportation Planning, Charles G. Beer, 874
Financing Future Intercity Transportation Systems, Ronald W. Pulling, 817
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364
Interstate = Benefits (Lives + Dollars), Frank Schneller, 313
Planning Public Mass Transportation, Henry D. Quinby, 827
Preserving Survey Monuments Despite Highway Construction, Winfield H. Eldridge, 321
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205
Traffic Accident Study on Milwaukee Expressway, Bruce A. Lind and H. Hong, 810
Transportation Centers, Wilbur S. Smith, 137
Urban Atmospheric Pollution, Albert F. Bush, 325

HISTORY
The Amazing Pennsylvania Canals, W. H. Shank, 57
The Hydrologic Cycle, A. K. Biswas, 273

HYDRAULIC JUMP
Flow Over a Vertical Sill in an Open Channel, Walter Rand, 794
Submerged Hydraulic Jump, Nallamuthu Rajaratnam, 633

HYDRAULICS
Areal Variations of Mean Annual Runoff, Allen G. Hely, 41
Analogue Procedure for Determination of Virtual Mass, O. C. Zienkiewicz and B. Nath, 193
Boundary Layer Development and Spillway Energy Losses, Frank B. Campbell, Robert C. Cox, and Marden B. Boyd, 872

HYDRAULICS Continued
Canal Discharge Measurements with Radioisotopes, Jack C. Schuster, 359
Capacity Tests in Large Concrete-Lined Canals, Paul J. Tilp, 846
Channel Gradients Above Gully-Control Structures, David A. Woolhiser and Arno T. Lenz, 619
Computer Analysis of Overland Flow, James R. Morgali and Ray K. Linsley, 857
Critical Analysis of Open-Channel Resistance, Hunter Rouse, 851
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639
Development of Ground Water in Hawaii, Leslie J. Watson, 401
Dispersion and Adsorption in Porous Media Flow, Robert B. Banks, and Iqbal Ali, 690
Effect of Spur Dikes on Flow Through Contractions, E. Robert Hedman, 722
Environmental Effects of Flood Plain Regulations, Eugene W. Weber and Walter G. Sutton, 805
Erosion and Deposition of Cohesive Soils, Emmanuel Partheniades, 319
Errors in Piezometric Measurement, William W. Emmett and James R. Wallace, 217
European Concepts of Sediment Transportation, John L. Bogardi, 860
Exact Free Surface of Gravity Wells, Abdel-Aziz I. Kashef, 798
Experiments on Small Streams in Alluvium, Peter Ackers, 373
Flow-Induced Vibrations—Experience of TVA with Hydraulic and Other Structures, James T. Price, 245
Flow Measurements at Columbia River Power Plants, Nicholas A. Dodge, 760
Flow Over a Vertical Sill in an Open Channel, Walter Rand, 794
Geometrical Properties of Sand-Waves, M. Selim Yalin, 76
Ground-Water Models Solved by Digital Computer, Irwin Remson, Charles A. Appel, and Raymond A. Webster, 855
High Lift Locks: Some Hydraulic Problems and Solutions, Ernest Pariset and André Gagnon, 131
Hydraulic Design of Pump Intakes, Ralph T. Hattersley, 347
Hydraulic Performance Comparison of Centrifugal Pumps, Michael J. Suess, 404
Hydraulic Studies of Jamaica Bay, Armando Balloffet and Arnold Kupferman, 255
Hyperconcentrations of Suspended Sediment, Joseph P. Beverage and James K. Culbertson, 430
An Inclined Plume, Garth S. Harris, 416
Initial Motion Problem in Porous Media, James A. Ligget and Christos Hadjitheorou, 408
Irrotational Flow Over Spillways of Finite Height, John J. Cassidy, 866
Large-Scale Roughness in Open-Channel Flow, John B. Herbich and Sam Shulits, 386
Measurement of Ruffled Water Surface Elevation, A. J. Raudkivi, 288
Men, Models, Methods, and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555
Modified Solutions for Decreasing Discharge Wells, Mahmoud A. Abu-Zied, Verne H. Scott, and Gert Aron, 707
Moving Interface in Coastal Aquifers, Jacob Bear and Gedeon Dagan, 598
Multivariate Technique for Synthetic Hydrology, Myron B. Fiering, 107
Nappe Oscillation, H. Ivan Schwartz, 71
Non-Newtonian Flows—Their Value in Civil Engineering, George Bugliarello, 509
Numerical Solution to a Dispersion Equation, Nobuhiro Yotsukura and Myron B. Fiering, 444
Pressure Distribution on Spillway Flip Buckets, Tio-Chun Chen and Yun-Sheng Yu, 776
River Flood Flows, Forecasts and Probabilities, Michael C. Quick, 546
Salt-Water Interface Near a Fresh-Water Canal, Norbert L. Ackermann and Pachern Sridurongkatum, 381
Sequential Generation of Rainfall and Runoff Data, Ven Te Chow and S. Ramaseshan, 696
Simple Apparatus for Producing Model Tides, Johan Albert Zwamborn, 283
Simplified Solution for Decreasing Flow in Wells, Gert Aron and Verne H. Scott, 675
Spillway Discharge Coefficients for Rock Island Dam, Claud C. Lomax, 539
Straight Drop Spillway Stilling Basin, Charles A. Donnelly and Fred W. Blaisdell, 732
Study of Static Pressure Along a Rough Boundary, J. L. Chao and Virgil A. Sandborn, 337
Submerged Hydraulic Jump, Nallamuthu Rajaratnam, 633
Tacitly Maximized Small Watershed Flood Estimates, Brian M. Reich and Lourens A. V. Hiemstra, 753
Theoretical Aspects of Seepage from Open Channels, Herman Bouwer, 377
Total Bed Material Transport, Avery A.

HYDRAULICS Continued
Bishop, Daryl B. Simons, and Everett V. Richardson, 471
Turbulence Measured by Electrokinetic Transducers, Hsing Chuang and Jack E. Cermak, 743
Turbulent Flow in Porous Media, J. C. Ward, 664
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, H. E. Dann, W. P. Hartwig, and J. R. Hunter, 17
Use of Interrelated Records to Simulate Streamflow, Leo R. Beard, 559
Vertical Drainage of an Unsaturated Soil, Irwin Remson, Ronald L. Drake, Samuel S. McNeary, and Edward M. Wallo, 223
Viscous and Boundary Effects on Virtual Mass, Norbert L. Ackermann and Anat Arbhabhirama, 230
Water Hammer Resulting From Cavitating Pumps, M. R. Carstens and T. W. Hagler, Jr., 277
Wave-Induced Oscillations in Harbors, Frederic Raichlen and Arthur T. Ippen, 183
Weather Modifications, University of Wyoming, Merlin C. Williams, 391
Wind Driven Water Currents, W. Douglas Baines and Douglas J. Knapp, 788
Withdrawal from Two-Layer Stratified Flows, Donald R. F. Harleman and Rex A. Elder, 764
Yearly Sea Level Variations for the United States, Steacy D. Hicks and William Shofnos, 456

HYDRODYNAMICS
Slow Viscous Flow of an Incompressible Suspension, Gerhard Oertel, 494
Solution of Highly Curvilinear Gravity Flows, Theodor S. Strelkoff, 355
Viscous and Boundary Effects on Virtual Mass, Norbert L. Ackermann and Anat Arbhabhirama, 230

HYDROELECTRIC POWER GENERATION
Canada—Hydro Development of the Manicouagan and Outardes Rivers in Quebec, Benoit Baribeau, 744
Colorado—Reclamation Firsts: Underground Power Plant at Morrow Point Dam, B. P. Bellport, 105
Contractor's View on Unlined Tunnels, Alfred M. Pertrofsky, 43
Tunnels for Hydroelectric Power in Tasmania, Henry H. Thomas and Lindsay S. Whitham, 84
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, H. E. Dann, W. P. Hartwig, and J. R. Hunter, 17
Unlined Tunnels of the Southern California Edison Company, Ralph W. Spencer, Bruce R. Laverty, and Dean A. Barber, 73

HYDROGRAPHS
Inflow Hydrographs from Large Unconfined Aquifers, Hassan Ali Ibrahim and Wilfied Brutsaert, 864

HYDROLOGY
Cycles in Hydrologic Data, J. R. Crippen, 86
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639
The Hydrologic Cycle, A. K. Biswas, 273
Men, Models, Methods, and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555
Moving Interface in Coastal Aquifers, Jacob Bear and Gedeon Dagan, 598
Multivariate Technique for Synthetic Hydrology, Myron B. Fiering, 107
River Flood Flows, Forecasts and Probabilities, Michael C. Quick, 546
Use of Interrelated Records to Simulate Streamflow, Leo R. Beard, 559

ILLINOIS
Duplicate Locks for Illinois Waterway, William J. Santina and George B. Wesler, 159

INCINERATION
Air Pollution from Incinerators—Causes and Cures, Leo P. Flood, 734
Arkansas—Sludge Burning at North Little Rock, Arnold J. Tyer, 215

INDIA
Irrigation in India: Past and Present, Asit K. Biswas, 523

INSPECTION
Florida—Liaison Insures Quality Control for Vehicle Assembly Building at Cape Kennedy, Charles I. Orr, 773
How to Improve Quality Control of Construction, Hal W. Hunt, 698
How to Inspect Construction, Benjamin P. Cohen, 591
Improved Inspection on the West Coast, John Steinbrugge, 613
Legal Aspects of Quality Control, Robert B. Jarvis, 600
Quality Control in Construction, W. O.

INSPECTION Continued
Hiltabidle, Jr., Bradford N. Clark, Charles E. Schaffner, John Nelson Linn, Ralph E. De Simone, Arnold H. Vollmer, Elmer B. Isaak, Leslie D. Long, Richard Q. Praeger, Hal W. Hunt, 660
Quality Controls for Steel Construction, Milton Brumer, 608

INSULATION
Alaska—Plastic Insulation vs. Deep Trenching for Seldovia Water Mains, Frank Nyman, 207

INTERCHANGES
Traffic Accident Study on Milwaukee Expressway, Bruce A. Lind and H. Hong, 810

IRRIGATION
Analysis of Water Advance in Surface Irrigation, Yu-Si Fok and A. Alvin Bishop, 669
Boundary Flow Considerations in the Design of Wells, Mostafa M. Soliman, 391
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639
Effect of Irrigation Method on Water Conservation, Jack Keller, 834
Effects of Competition on Efficiency of Water Use, Jay M. Bagley, 547
Evaporation Reduction on Large Reservoirs, C. Earl Israelsen and Vaughn E. Hansen, 784
Future Quantity and Quality of Colorado River Water, Raymond A. Hill, 837
Irrigation in India: Past and Present, Asit K. Biswas, 523
Irrigation Water Requirements of Lawns, Tyler H. Quackenbush and John T. Phelan, 849
Irrigation Water Requirements in Texas, Charles B. Thompson, 200
New Type Weir Construction for Small Watersheds, Neal E. Minshall and Ralph G. Spomer, 189
Nonuniformity and Sprinkler Application Efficiency, David T. Howell, 804
Operating a Sea Water Barrier Project, Arthur E. Bruington and Frederick D. Seares, 636
Progress in Waste Water Re-Use in Southern California, John D. Parkhurst, 569
Rice Irrigation, Lee Chow, 724
Sprinkler Nonuniformity Characteristics and Yield, David T. Howell, 814
Transitory Irrigation Developments, Raymond A. Hill, 211

JOINTS
Analysis of Bolted Butt Joints, John W. Fisher and John L. Rumpf, 738
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854
Bolted Bridge Behavior During Erection and Service, Eugene Chesson, Jr., 120
Criteria for Designing Bearing-Type Bolted Joints, John W. Fisher and Lynn S. Beedle, 751
Misalinement in Bolted Joints, Desi D. Vasarhelyi and William N. Chang, 460
The Prestressed Glued Joint for Steel Connections, George Kostro, 294
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766

LABORATORIES
Measurement of Ruffled Water Surface Elevation, A. J. Raudkivi, 288

LAKE MEAD
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639

LEGISLATION
Collective Bargaining for Municipal Engineers, Herman P. Zanoni, 577
A Lawyer Looks at Stream Pollution, William Gross, 243
Legal Aspects of Quality Control, Robert B. Jarvis, 600
Preserving Survey Monuments Despite Highway Construction, Winfield H. Eldridge, 321
A Revolution in the Water Resources Field, William Whipple, Jr., 750

LEVELING
Vertical Control on the Great Lakes, Gilbert E. Ropes, 561

LIFT SLAB CONSTRUCTION
Prestressed Lift Slabs Withstand Fire, G. E. Troxell, 762
Utah—Lift Slabs (in Salt Lake City) Cast under Plastic Cover for Raising in Spring, Robert Sawyer, 454

LIGHTHOUSES
Steel Offshore Towers as Navigation Aids, J. V. Ruffin, 645
Virginia—Construction of Chesapeake Light Station, John W. Fowler, 650

LIMIT-DESIGN METHOD (Structural)
Loading Effects in Structural Steel Design, Richard N. Wright and William J. Hall, 195

LIQUEFIED GASES
Storage Containers for Liquefied Natural Gas, P. J. Anderson and A. R. Khan, 516

LOADS (Forces)
Development of Arch Action in Arch Dams, K. V. Swaminathan, 135
Elastic Loading of High Pressure Cylinders, Raymond Epain and Boris Vodar, 775
Grain Size and Loading Effects on Steel, Russell C. Jones and John A. Hribar, 56
Impulsive Loading Theorems for Rigid-Plastic Continua, John B. Martin, 746
Loading Effects in Structural Steel Design, Richard N. Wright and William J. Hall, 195
Measuring Instruments for Strutted Excavating, Lauritis Bjerrum, T. Cameron Kenney, and B. Kjaernsli, 568
Plastic Analysis and Design of Non-Prismatic Members, Bruce G. Rogers and William H. Munse, Jr., 366
Probability of Structural Failure Under Random Loading, Masanobu Shinozuka, 165
Snow Loads for Roofs, Albert E. Anderson, 474
Two Degree-of-Freedom Elastoplastic Response to a Step Velocity Pulse, Robert H. Anderson, 581

LOCKS (Barriers)
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634
Belleville Locks on the Ohio River, R. B. Howard, 621
Duplicate Locks for Illinois Waterway, William J. Santina and George B. Wesler, 159
Engineering Measurements for Port Allen Lock, R. I. Kaufman and W. C. Sherman, Jr., 29
High Lift Locks: Some Hydraulic Problems and Solutions, Ernest Pariset and André Gagnon, 131

LOS ANGELES, CALIFORNIA
Progress in Waste Water Re-Use in Southern California, John D. Parkhurst, 569

MAINTENANCE
Barge Decks Resurfaced with Asphalt, William P. Helbock, 627
New Jersey—A Revolution in Sewer Maintenance at Woodbridge, Charles W. Beagle, 141
New York—Linseed-Oil Protection for New York State Thruway Bridges, Robert J. Walsh, 457
North Carolina—Controlling Leakage from Cowans Ford Dam, Joe T. Moore, 357
Structural Maintenance—the Third Element in the Structural Engineer's Professional Package, T. C. Kavanagh and S. M. Johnson, 309

MANAGEMENT
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
Guide to Development and Use of Electronic Computer Programs: Introduction, Steven J. Fenves, 261

MAPPING
Arctic Siting and Surveying, Max O. Laird, 829
The Case of the Missing Curriculum, Kenneth S. Curtis, 700
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364
Reservoir Topography by Shoreline Plotting, David L. Crandall, 579
Surveying and Mapping for Water Resource Planning, Kurt W. Bauer, 19

MAPS
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364

MARINAS
Marinas and Yacht Clubs—Planning and Financing, Stephen M. Olko, 353

MASONRY
Charts Simplify Reinforced-Masonry Design, J. N. Littlefield, 485
Masonry Walls on Continuous Beams, Saky Rosenhaupt and Yehuda Sakal, 504

MATERIALS
An Applied Science of Materials for Civil Engineers, Edward M. Krokosky, 436
Ceramics as Structural Materials, Francis R. Shanley and William J. Knapp, 403

MATERIALS Continued
Thermal-Shock Effects on a Space Vehicle, Lewis Li-Tang Au and Donald J. Trent, 525

MATERIALS TESTING
Photosensitive Plastics Extend the Range of Photoelastic Stress Studies, John P. Cook, 711

MATHEMATICS
Analysis of Contained Plastic Flow in Plane Solids, Alfredo H. S. Ang and Goin N. Harper, 304
Heat Analysis—A Tensoral-Dimensional Approach, Sidney F. Borg, 825
Impulsive Loading Theorems for Rigid-Plastic Continua, John B. Martin, 746
Influence Functions for Beams on Elastic Foundations, Alexander Dodge, 102
Men, Models, Methods and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555
Model for Wave Motions in Axi-Symmetric Solids, Alfredo H. S. Ang and Johann H. Rainer, 266
Pressure Distribution of Spillway Flip Buckets, Tio-Chun Chen and Yun-Sheng Yu, 776

MATRICES
Buckling of Multistory Buildings, John E. Goldberg, 60
Finite Element Analysis of Axi-Symmetric Solids, Ray W. Clough and Yusef Rashid, 98
Network Analysis of Structures, Frank L. Di Maggio and William R. Spillers, 122

MEASUREMENT
The Metric System Now, Frits H. Fenger, 740

MEASURING INSTRUMENTS
Canal Discharge Measurements with Radioisotopes, Jack C. Schuster, 359
Engineering Measurements for Port Allen Lock, R. I. Kaufman and W. C. Sherman, Jr., 29
Errors in Piezometric Measurement, William W. Emmett and James R. Wallace, 217
Flow Measurements at Columbia River Power Plants, Nicholas A. Dodge, 760
Measurement of Ruffled Water Surface Elevation, A. J. Raudkivi, 288
Measuring Instruments for Strutted Excavating, Lauritis Bjerrum, T. Cameron Kenney, and B. Kjaernsli, 568
Self-Recording Soil Penetrometer, Bengt B. Broms and D. E. Broussard, 311
Simple Apparatus for Producing Model Tides, Johan Albert Zwamborn, 283
Submerged Hydraulic Jump, Nallamuthu Rajaratnam, 633
Tumut 2 Underground Power Plant, Ivor L. Pinkerton and Eric J. Gibson, 23

MEMBRANES
Large Deflection of Heated Plates, Marion W. Wilcox and Lewis E. Clemmer, 181

METRIC SYSTEM
The Metric System Now, Frits H. Fenger, 740

MILITARY ENGINEERING
Military Engineering in Vietnam, Peter A. Corradi, 617

MISSISSIPPI RIVER
Foreshore Protection, Lower Mississippi River, Rudolf Hertzberg, 573

MISSOURI RIVER
Machine Tunneling on Missouri River Dams, Lloyd B. Underwood, 780

MODELS
Analysis of Biological Filter Variables, William S. Galler and Harold B. Gotaas, 237
Analysis of Contained Plastic Flow in Plane Solids, Alfredo H. S. Ang and Goin N. Harper, 304
Discrete Dynamic Models for Elasto-Inelastic Beams, R. Wen and T. Toridis, 187
Ground-Water Models Solved by Digital Computer, Irwin Remson, Charles A. Appel, and Raymond A. Webster, 855
Men, Models, Methods and Machines in Hydrologic Analysis, Willard M. Snyder and John B. Stall, 555
Multivariate Technique for Synthetic Hydrology, Myron B. Fiering, 107
The Nature of Damping in Sands, Bobby O. Hardin, 299
Predicting Structural Behavior Analytically, Edward O. Pfrang and Chester P. Siess, 289
Rock Trap Experience in Unlined Tunnels, John J. Mattimoe, E. Roy Tinney, and W. Weston Wolcott, 33
Seismic Study of Arch Dams, J. Laginha Serafim and J. Oliveira Pedro, 590
Simple Apparatus for Producing Model Tides, Johan Albert Zwamborn, 283
Stochastic Model for Predicting Sub-

MODELS Continued
sidence, Arnold L. Sweet and John L. Bogdanoff, 59
Stresses in Hyperboloids under Edge Loadings, David G. Elms, David P. Billington, and Robert Mark, 498
Turbulent Mixing Phenomena of Ocean Outfalls, Richard J. Frankel and James D. Cumming, 728
Wave-Induced Oscillations in Harbors, Frederic Raichlen and Arthur T. Ippen, 183

MONORAILS
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205

MONUMENTS
Missouri—St. Louis Steel Arch, Symbol of the Spirit of the Pioneers, J. E. N. Jensen, 594

MOON
Engineering Challenges of Lunar Exploration, Daniel L. Lycan, 726

MUNICIPAL ENGINEERING
Collective Bargaining for Municipal Engineers, Herman P. Zanoni, 577
Municipal Engineering Is a Profession, Douglas Talbot, 263

NAVIGATION
High Lift Locks: Some Hydraulic Problems and Solutions, Ernest Pariset and André Gagnon, 131

NEW YORK CITY
Hydraulic Studies of Jamaica Bay, Armando Balloffet and Arnold Kupferman, 255

NILE RIVER VALLEY
Natural Drainage of River Valleys, Hammad Y. Hammad, 227

NOMOGRAPHS
Charts Simplify Reinforced-Masonry Design, J. N. Littlefield, 485
Designing Isolated Footings against Overturning, Donald G. Newnan, 672
Minimum Base Lengths for Cantilever Retaining Walls, Semih Tezcan, 683

NUCLEAR ENERGY
Has Nuclear Power Become Competitive?, R. N. Bergstrom, 96
Nuclear Craters for Water Resources Development and Management, David K. Todd, 329
Reactor Containment and Environmental Considerations, Raymond O. Brittan, 315

NUCLEAR EXPLOSIONS
Nuclear Excavation of a Sea-Level Isthmian Canal, Luke J. Vortman, 209

OCEANS
Turbulent Mixing Phenomena of Ocean Outfalls, Richard J. Frankel and James D. Cumming, 728
Yearly Sea Level Variations for the United States, Steacy D. Hicks and William Shofnos, 456

OFFICE BUILDINGS
Canada—Toronto Office-Building Complex Breaks Records, John L. Kellermann, 368
Combination Water Systems for High-Rise Buildings, G. D. Testin, 232
Missouri—Arc Welding Speeds Construction of Springfield Office Building, Rudolph F. Fischl and Georg Klatte, 133

OFFSHORE CONSTRUCTION
Steel Offshore Towers as Navigation Aids, J. V. Ruffin, 645
Virginia—Construction of Chesapeake Light Station, John W. Fowler, 650

OPEN-CHANNEL FLOW
Theoretical Aspects of Seepage from Open Channels, Herman Bouwer, 377

OXIDATION
Role of Protozoa in the Diphasic Exertion of BOD, Manmohan N. Bhatla and Anthony F. Gaudy, Jr., 507

PAVEMENTS
Barge Decks Resurfaced with Asphalt, William P. Helbock, 627
Electric Controls for Laying Smooth Pavements, R. L. Peurifoy, 757
Mathematical Method for Blending Aggregates, Donald L. Neumann, 64
Stress Repetition in Pavement Design, Richard G. Ahlvin and Donald N. Brown, 782
Texas—Houston Airport, a Study in Engineer-Contractor Harmony, H. O. Fischer, 553

PERMEABILITY
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Sample Size Estimates in Permeabil-

PERMEABILITY Continued
ity Studies, Lyman S. Willardson and Rex L. Hurst, 777
Turbulent Flow in Porous Media, J. C. Ward, 664

PHOTOELASTICITY
Large Strain Analysis and Stresses in Linear Materials, August J. Durelli and Alfred P. Mulzet, 139
Photosensitive Plastics Extend the Range of Photoelastic Stress Studies, John P. Cook, 711
Tumut 2 Underground Power Plant, Ivor L. Pinkerton and Eric J. Gibson, 23

PHOTOGRAMMETRY
The Case of the Missing Curriculum, Kenneth S. Curtis, 700
Double Summation of Errors in Aerial Triangulation, Gordon Gracie, 527
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364
Reservoir Topography by Shoreline Plotting, David L. Crandall, 579

PIERS
Critical Analysis of Open-Channel Resistance, Hunter Rouse, 851
Pile and Pier Foundations, Ralph B. Peck, 224

PILES AND PILE DRIVING
Buckling of Long Unsupported Timber Piles, Earle J. Klohn and G. T. Hughes, 235
Design of Laterally Loaded Piles, Bengt B. Broms, 389
Lateral Resistance of Piles in Cohesionless Soils, Bengt B. Broms, 475
Lateral Resistance of Piles in Cohesive Soils, Bengt B. Broms, 478
Lateral Response of Piles, William R. Spillers and Robert D. Stoll, 231
Pile and Pier Foundations, Ralph B. Peck, 224
Piles in Cohesionless Soil Subject to Oblique Pull, Yoshiaki Yoshimi, 229
The Structural Action of Pile Cluster Dolphins, David G. Elms and Werner E. Schmid, 816

PIPELINES
Alabama—Paddle Wheels for Traction in a Swamp, 691
California—Planning and Anchoring 12 Miles of Big Pipe for Santa Clara County, M. K. Harris, 345
Georgia—River Bypass Boosts Efficiency of Power Plant on Chattahoochee River, 714
California—Steel Pipe for South Bay Aqueduct, Alfred R. Golzé, 166
Hydraulic Testing of the 24-in. Leidy Line, Denver S. Patton, Jr., 656
New Jersey—A Revolution in Sewer Maintenance at Woodbridge, Charles W. Beagle, 141
Understanding and Controlling Corrosion, Harry Neugold, Jr., 239
Understanding the Corrosion Resistance of Concrete Pipe, John A. Shaw, 396
Water Supply for Saigon, Walter T. McPhee, 426

PIPES
Colorado—70-ft Underpass of Corrugated Steel Pipe for Broadmoor Hotel, Colorado Springs, Nick Pinello, 638

PLANNING
Engineering Principles of Urban Transportation Planning, Kurt W. Bauer, 821
Functional Planning of Bulk Material Ports, Leonard S. Oberman, 88
Guide to Development and Use of Electronic Computer Programs: Program Planning, Steven J. Fenves, 15
Installation Procedure for Hot Metal Facility, L. Earl Tabler, Jr., 7
Progress in Waste Water Re-Use in Southern California, John D. Parkhurst, 569

PLASTIC DESIGN
Flange Local Buckling in Wide-Flange Shapes, Maxwell G. Lay, 806

PLASTICITY
Analysis of Contained Plastic Flow in Plane Solids, Alfredo H. S. Ang and Goin N. Harper, 304
Clay Mineralogical Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 285
Experimental Rotation of Steel Beam-Columns, Giuliano Augusti, 291
Flange Local Buckling in Wide-Flange Shapes, Maxwell G. Lay, 806
Fundamental Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 531
Importance of Strain Hardening in Plastic Design, Alexander P. Hrennikoff, 856
Plastic Analysis and Design of Non-Prismatic Members, Bruce G. Rogers and William H. Munse, Jr., 366
Plastic Behavior of Tubular Beam Columns, Timothy J. Dwyer and Theodore V. Galambos, 537
Shakedown Analysis of Some Typical

PLASTICITY Continued
One-Story Bents, Egor P. Popov and Eric Becker, 186
Spherical Elastic Plastic Shock Propagation, Morton B. Friedman, Hans H. Bleich, and Raymond Parnes, 76
Yielding of Uniformly Loaded Steel Members, Maxwell G. Lay, 800

PLASTICS
Alaska—Plastic Insulation vs. Deep Trenching for Seldovia Water Mains, Frank Nyman, 207
Utah—Lift Slabs (in Salt Lake City) Cast under Plastic Cover for Raising in Spring, Robert Sawyer, 454

PLATES (Structural Members)
Analysis of Multicell Box Gates for Dry Docks, Mohamed Ali El-gaaly, 435
Analysis of Truss-Plate Structures, James W. Gillespie, 551
Bending of Circular Sandwich Plates, Jao-Shiun Kao, 438
Elastic Plates Subjected to Moving Heat Sources, Ardeshir Jahanshahi, 450
Elastostatic Problem of a Perforated Square Plate, Alois L. Schlack and Robert W. Little, 51
Face-Wrinkling Mode of Buckling of Sandwich Panels, Billy J. Harris and W. C. Crisman, 575
Grid-Framework Method for Plates in Flexure, Alan L. Yettram and Husain M. Husain, 778
Large Deflection of Heated Plates, Marion W. Wilcox and Lewis E. Clemmer, 181
Optimum Synthesis of Prestressed Structures, George I. N. Rozvany, 157
Reinforcing for a Rectangular Opening in a Plate, Robert R. Snell and Marion B. Scott, 463
Stresses in a Uniformly Loaded Two-Layer Circular Plate, Martin A. Goldberg, Malcolm Newman, and Marvin J. Forray, 652
Vibrations and Stability of Buckled Panels, Yao W. Chang and Ernest F. Masur, 755

POLAND
Inland Water Transportation in Poland, Fryderick Tomala, 875

POLLUTION
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham and E. Robert Baumann, 514

POWER
California—California Water Project, Power Plans and Demands, Alfred R. Golzé, 100
Design of Karadj Arch Dam, Jan A. Veltrop and Roman P. Wengler, 213
Development of Arch Action in Arch Dams, K. V. Swaminathan, 135
East Pakistan—Master Plan for Water and Power Development, Ernest M. Bowles, 483
Latest Developments in Transporting Coal by Rail, Richard N. Bergstrom and Kenneth W. Hamming, 681
Short Span Sag Calculations with Insulator Bells, Thomas E. Leland, 127
Some Challenges in Power, Wallace L. Chadwick, 657
Tests Verify Design for TVA's 500-kv Towers, Gene M. Wilhoite, 90
Tumut 2 Underground Power Plant, Ivor L. Pinkerton and Eric J. Gibson, 23
Tunnels for Hydroelectric Power in Tasmania, Henry H. Thomas and Lindsay S. Whitman, 84
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, H. E. Dann, W. P. Hartwig, and J. R. Hunter, 17
Virginia—Towers for a 500-kv Transmission Line, S. D. Alpert and J. D. Shaw, 123

POWER PLANTS
Has Nuclear Power Become Competitive?, R. N. Bergstrom, 96

PRECAST CONCRETE
Two Large Shells of Post-Tensioned Precast Concrete—Oklahoma Arena and Arizona Coliseum, T. Y. Lin and Ben W. Young, 488

PRECIPITATION
Weather Modifications, University of Wyoming, Merlin C. Williams, 391

PRESSURE GAGES
Lateral Pressure of Concrete on Formwork, R. L. Peurifoy, 679

PRESTRESSED CONCRETE
Anchor Zone Stresses in Prestressed Concrete Beams, Pijushkanti Som and Kalyanmay Ghosh, 94
Expanding a Prestressed Concrete Plant, George Laszlo, 259
Optimum Synthesis of Prestressed Structures, George I. N. Rozvany, 157

PRESTRESSED CONCRETE Continued
Post-tensioned Viaduct Piers, Edward P. Keiner, Jr., 79

PRESTRESSING
The Prestressed Glued Joint for Steel Connections, George Kostro, 294

PROBABILITY THEORY
Probabilistic Design to Resist Earthquakes, Emilio Rosenblueth, 112
Probability of Structural Failure Under Random Loading, Masanobu Shinozuka, 165
Validity of a Stochastic Model for Predicting Subsidence, Arnold L. Sweet, 783

PROFESSIONAL ADVANCEMENT
An Awareness of Reality, Bruce G. Johnston, 31
A Civil Engineer—and Proud of It, Wallace L. Chadwick, 21
Continuing Education, William H. Wisely, 92
A Design for the Future, Wallace L. Chadwick, 406
You and Your Local Section, W. L. Chadwick, 222

PROFESSIONAL PRACTICE
Challenge to Civil Engineering, Harvey Brooks, 344
Educational Requirements for Water Resource Engineers, Alfred R. Golzé, 606
Education for Sanitary Engineers, E. Sherman Chase, 301
Factors Considered in Urban Transportation Planning, Charles G. Beer, 874
A Revolution in the Water Resources Field, William Whipple, Jr., 750
Teaching Engineering Attitude to Students, Malcolm S. Gregory, 361
Trend in Water Resources Education, Carl E. Kindsvater, 369

PROFILES
Electric Controls for Laying Smooth Pavements, R. L. Peurifoy, 757

PROTECTIVE COATINGS
Understanding and Controlling Corrosion, Harry Neugold, Jr., 239

PUBLIC HEALTH
Rice Irrigation, Lee Chow, 724

PUBLIC WORKS
Unethical Sabotage of Public Projects, William H. Wisely, 708

PUMPS
Hydraulic Performance Comparison of Centrifugal Pumps, Michael J. Suess, 404
Hydraulic Design of Pump Intakes, Ralph T. Hattersley, 347
Water Hammer Resulting From Cavitating Pumps, M. R. Carstens and T. W. Hagler, Jr., 277

PURIFICATION
Role of Protozoa in the Diphasic Exertion of BOD, Manmohan N. Bhatla and Anthony F. Gaudy, Jr., 507

QUALITY CONTROL
Florida—Liaison Insures Quality Control for Vehicle Assembly Building at Cape Kennedy, Charles I. Orr, 773

RADAR
Arecibo Radar-Radio Telescope—Design and Construction, Thomas C. Kavanagh and David H. H. Tung, 625

RADIOACTIVITY
Reactor Containment and Environmental Considerations, Raymond O. Brittan, 315

RAILROADS
Latest Developments in Transporting Coal by Rail, Richard N. Bergstrom and Kenneth W. Hamming, 681
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205

RAINFALL
County Rain-Gage Network Useful in Design, Alfred R. Pagan and Ronald Rothenberg, 269
Irrigation Water Requirements of Lawns, Tyler H. Quackenbush and John T. Phelan, 849
Sequential Generation of Rainfall and Runoff Data, Ven Te Chow and S. Ramaseshan, 696

RAPID TRANSIT
Airports and Transit Systems—the Engineer's Challenge, J. K. Carr, 233
California—Rapid-Transit Test Track for San Francisco, Leslie A. Irvin, 496
Jackson, Miss., in 2039 A. D., 252
The Netherlands—Rotterdam's Rapid Transit Tunnel, Ir G. Plantema, 520
Technological Aspects of Urban Transportation, Donald S. Berry and Paul W. Shuldiner, 205

REACTORS
Reactor Containment and Environmental Considerations, Raymond O. Brittan, 315

RECLAMATION
Forest Drainage Research in the Coastal Plain, Ralph A. Klawitter and Cortland E. Young, Jr., 736
Quality Aspects of Waste Water Reclamation, Paul R. Bonderson, 169

RECREATIONAL FACILITIES
Utah—A National Forest at Vernal Goes Modern, D. G. Dalley, 768

REGISTRATION
The Dilemma of the Professional Engineers' Licensing Program, Arthur W. Weber, 317

REGULATIONS
Environmental Effects of Flood Plain Regulations, Eugene W. Weber and Walter G. Sutton, 805

REINFORCED CONCRETE
Behavior of Restrained Reinforced Concrete Columns, Edward O. Pfrang and Chester P. Siess, 341
Deflections of Multiple-Panel Reinforced Concrete Floor Slabs, Mortimer D. Vanderbilt, Mete A. Sozen, and Chester P. Siess, 769
Masonry Walls on Continuous Beams, Saky Rosenhaupt and Yehuda Sakal, 504
Predicting Structural Behavior Analytically, Edward O. Pfrang and Chester P. Siess, 289
Ultimate Strength of Reinforced Concrete Flat Slabs, Morris W. Self, 27

REINFORCEMENT
Reinforcing for a Rectangular Opening in a Plate, Robert R. Snell and Marion B. Scott, 463

RESEARCH
Computer System Designed for Teaching and Structural Research at MIT, William Litle and Kenneth Reinschmidt, 542
Factors Considered in Urban Transportation Planning, Charles G. Beer, 874
Forest Drainage Research in the Coastal Plain, Ralph A. Klawitter and Cortland E. Young, Jr., 736
A Revolution in the Water Resources Field, William Whipple, Jr., 750
Weather Modifications, University of. Wyoming, Merlin C. Williams, 391

RESERVOIRS
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639
Irrigation in India: Past and Present, Asit K. Biswas, 523

RETAINING WALLS
Earth Pressures for Bilinear Backfill Surface, B. Satyanarayana, 295
Minimum Base Lengths for Cantilever Retaining Walls, Semih Tezcan, 683

REVETMENTS
Cellular Concrete Block Revetment, D. A. Parsons and R. P. Apmann, 128
Influence of Soil Types on Stabilization of the Savannah River, William J. Wall, 717
Stabilizing the Lower Mississippi River, Ellsworth I. Davis and Ernest B. Lipscomb, 630

RIVERS
Foreshore Protection, Lower Mississippi River, Rudolf Hertzberg, 573
River Flood Flows, Forecasts and Probabilities, Michael C. Quick, 546
Stabilizing the Lower Mississippi River, Ellsworth I. Davis and Ernest B. Lipscomb, 630
Tidal Characteristics of Two Estuaries in Florida, William B. Stelzenmuller, 545

RIVETS
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854

ROCKFILL DAMS
Earthquake Stability of Slopes of Cohesionless Soils, H. Bolton Seed and Richard E. Goodman, 466

ROOFS
Analysis Comparisons for Single Curved Shell Roofs, Paul E. Mast, 790
Geometry of Suspended Cloth Roofs, Avinadav Siev, 859
Snow Loads for Roofs, Albert E. Anderson, 474
Utah—A National Forest at Vernal Goes Modern, D. G. Dalley, 768

RUNOFF
Areal Variations of Mean Annual Runoff, Allen G. Hely, 41
Sequential Generation of Rainfall and Runoff Data, Ven Te Chow and S. Ramaseshan, 696

SAFETY
Aircraft Arresting System, Francis J. Rhody, 685

SALARIES
Fringe Benefits in Civil Engineering Compensation, Clair A. Hill, 432

SAND (Material)
The Nature of Damping in Sands, Bobby O. Hardin, 299
Shock-Induced Stress Wave Propagation in Sand, Ernest T. Selig and Eben Vey, 125
Yielding and Locking of Confined Sand, Robert V. Whitman, T. Edmond, and Peter J. Moore, 197

SANITARY ENGINEERING
Air Pollution from Incinerators—Causes and Cures, Leo P. Flood, 734
Alaska—Utilities for a Relocated Town in Valdez, James W. Poirot, 173
Analysis of Biological Filter Variables, William S. Galler and Harold B. Gotaas, 237
Arkansas—Sludge Burning at North Little Rock, Arnold J. Tyer, 215
Better Activated Sludge by the Kessener-Brush Aeration Process, H. R. Carter, 792
BOD and Oxygen Relationships in Streams, William E. Dobbins, 225
Closed Ecological Systems, William J. Oswald, Clarence G. Golueke, and D. O. Horning, 868
Colorado—Denver's Metro Waste Treatment Plant, William L. Bredar, 687
Compartmentalization of Aeration Tanks, William F. Milbury, Wesley O. Pipes, and Robert B. Grieves, 748
Design Aspects of Lompoc Water Treatment Plant, Charles H. Lawrance, 275
Dispersion Measurement in Open Channels, Calvin C. Patterson and Earnest F. Gloyna, 46
Education for Sanitary Engineers, E. Sherman Chase, 301
Evaluation of Two Aerated Lagoons, Ross E. McKinney and Henry H. Benjes, Jr., 842
Environmental Hazards of Radioactive Wastes, Joe O. Ledbetter, 615
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
Filtration Through Size-Graded Media, Ernest W. J. Diaper and Kenneth J. Ives, 771
Flow Characteristics of PVC Sewer Pipe, Lawrence C. Neale and Robert E. Price, 840
Intensity of Radiation and Rate Sludge Drying, Jimmie E. Quon and Thomas A. Tamblyn, 249
Life Support Requirements for Space Missions, Charles M. Proctor, 155
Missouri—Pollution Abatement Program for Kansas City, Glen J. Hopkins, 571
Nutrient Removal by Effluent Spraying, Herbert B. Foster, Jr., Paul C. Ward, and Arnold A. Prucha, 820
An Oxidation Pond as a Tertiary Treatment Device, Raymond C. Loehr and Ralph L. Stephenson, 877
Quality Aspects of Waste Water Reclamation, Paul R. Bonderson, 169
Role of Protozoa in the Diphasic Exertion of BOD, Manmohan N. Bhatla and Anthony F. Gaudy, Jr., 507
Second Order Equation for BOD, James C. Young and John W. Clark, 267
Studies in Force Main Aeration, James E. Laughlin, 179
Theory of Water Filtration, Thomas R. Camp, 1
Turbulent Flow in Porous Media, John C. Ward, 664
Turbulent Mixing Phenomena of Ocean Outfalls, Richard J. Frankel and James D. Cumming, 728
Washington—Seattle's Record-Breaking Sewage-Treatment System, Fred E. Lange, 151
Water for the World, M. D. Morris, William E. Wood, James J. Geraghty, James Gould, Gordon R. Williams, Donald F. Othmer, Donald R. Lueder, Malcolm Pirnie, Jr., and Arthur C. Ford, 802
Water Renovation—Some Advanced Treatment Processes, David G. Stephan, 563

SCHOOLS
Prestressed Lift Slabs Withstand Fire, G. E. Troxell, 762

SEDIMENTATION
Channel Gradients Above Gully-Control Structures, David A. Woolhiser and Arno T. Lenz, 619
European Concepts of Sediment Transportation, John L. Bogardi, 860
Stability of Channels by Armorplating, Dasel E. Hallmark and George L. Smith, 796

SEDIMENTS
Erosion and Deposition of Cohesive Soils, Emmanuel Partheniades, 319
European Concepts of Sediment Transportation, John L. Bogardi, 860
Hyperconcentrations of Suspended Sediment, Joseph P. Beverage and James K. Culbertson, 430

SEEPAGE
Exact Free Surface of Gravity Wells, Abdel-Aziz I. Kashef, 798
Natural Drainage of River Valleys, Hammad Y. Hammad, 227
North Carolina—Controlling Leakage from Cowans Ford Dam, Joe T. Moore, 357
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Salt-Water Interface Near a Fresh-Water Canal, Norbert L. Ackermann and Pachern Sridurongkatum, 381
Theoretical Aspects of Seepage from Open Channels, Herman Bouwer, 377
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham and E. Robert Baumann, 514

SETTLEMENT (Structural)
Consolidation of Nonhomogeneous Clay Layers, Robert L. Schiffman and Robert E. Gibson, 659
Differential Settlement at Selfridge Air Force Base, George B. Wallace and William C. Otto, 70
Field Observations of Structures Damaged by Settlement, Donald McKinley, 316
Foundations on Fissured Limestone—How They Were Selected, Henry M. Reitz, 543
Interpretation of the Consolidation Test, Carl B. Crawford, 13
Methods of Estimating Settlement, T. William Lambe, 65
Settlement of Buildings on the MIT Campus, Harry M. Horn and T. William Lambe, 221
Shallow Foundations, George G. Meyerhof, 441
State-of-the Art of Floating Foundations, Hugh Q. Golder, 327
Subsurface Stabilization of Organic Silty Clay by Precompression, Ernest Jonas, 242
Tolerance of Structures to Settlement, Jacob Feld, 398

SEWAGE DISPOSAL
Nutrient Removal by Effluent Spraying, Herbert B. Foster, Jr., Paul C. Ward, and Arnold A. Prucha, 820

SEWAGE TREATMENT
Arkansas—Sludge Burning at North Little Rock, Arnold J. Tyer, 215
Better Activated Sludge by the Kessener—Brush Aeration Process, H. R. Carter, 792
Colorado—Denver's Metro Waste Treatment Plant, William L. Bredar, 687
Evaluation of Two Aerated Lagoons, Ross E. McKinney and Henry H. Benjes, Jr., 842
Intensity of Radiation and Rate Sludge Drying, Jimmie E. Quon and Thomas A. Tamblyn, 249
Missouri—Pollution Abatement Program for Kansas City, Glen J. Hopkins, 571
An Oxidation Pond as a Tertiary Treatment Device, Raymond C. Loehr and Ralph L. Stephenson, 877
Washington—Seattle's Record-Breaking Sewage-Treatment System, Fred E. Lange, 151

SEWERAGE
Missouri—Pollution Abatement Program for Kansas City, Glen J. Hopkins, 571

SEWERS
Flow Characteristics of PVC Sewer Pipe, Lawrence C. Neale and Robert E. Price, 840
New Jersey—A Revolution in Sewer Maintenance at Woodbridge, Charles W. Beagle, 141
Studies in Force Main Aeration, James E. Laughlin, 179

SHEAR STRENGTH
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854
In-Situ Strength Characteristics of Soft Clays, I. Noorany and H. Bolton Seed, 323
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766
Stability of Slopes in Anisotropic Soils, Kwan Yee Lo, 518
Tilt and Deflections of Tapered Polygonal Towers, Ralph J. Pschunder, 143

SHEAR STRESS
Tilt and Deflections of Tapered Polygonal Towers, Ralph J. Pschunder, 143
Wind Driven Water Currents, W. Douglas Baines and Douglas J. Knapp, 788

SHELLS (Structural Forms)
Combined Aerodynamic and Structural Design of Lightweight Flight Structures, Robert W. Fralich, 505
Complementary Energy Theorem for Symmetric Shells, Charles Libove, 623
Finite Element Solution for Axisymmetrical Shells, Egor P. Popov, Joseph Penzien, and Zung-An Lu, 114

SHELLS Continued
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279
Two Large Shells of Post-Tensioned Precast Concrete—Oklahoma Arena and Arizona Coliseum, T. Y. Lin and Ben W. Young, 488
Response of a Cylindrical Shell to an Elastic Wave, Michael J. Forrestal, Dronnadula V. Reddy, and George Herrmann, 52
Stresses in Hyperboloids under Edge Loadings, David G. Elms, David P. Billington, and Robert Mark, 498

SHIPS
Analogue Procedure for Determination of Virtual Mass, O. C. Zienkiewicz and B. Nath, 193

SHOCK
Impulsive Loading Theorems for Rigid-Plastic Continua, John B. Martin, 746
On the Shock Response of Inelastic Beams, Kenneth E. Blanchard and Albert B. Schultz, 655
Shock Waves in Granular Soil, Robert D. Stoll and Ibrahim A. Ebeido, 459
Thermal-Shock Effects on a Space Vehicle, Lewis Li-Tang Aug and Donald J. Trent, 525
Two Degree-of-Freedom Elastoplastic Response to a Step Velocity Pulse, Robert H. Anderson, 581

SHORE PROTECTION
Foreshore Protection, Lower Mississippi River, Rudolf Hertzberg, 573

SLABS
Deflections of Multiple-Panel Reinforced Concrete Floor Slabs, Mortimer D. Vanderbilt, Mete A. Sozen, and Chester P. Siess, 769
Ultimate Strength of Reinforced Concrete Flat Slabs, Morris W. Self, 27

SNOW
Snow Loads for Roofs, Albert E. Anderson, 474

SOIL MECHANICS
Analysis of Clay Deformation As A Rate Process, Richard W.Christensen and Tien Hsing Wu, 334
Approximation for Terzaghi's Bearing Capacity Factors, Raymond J. Krizek, 55
Clay Mineralogical Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 285
Compressibility of Clay, Gerald A. Leonards and Adolph G. Altschaeffl, 303
Consolidation of Nonhomogeneous Clay Layers, Robert L. Schiffman and Robert E. Gibson, 659
Consolidation Testing with Back Pressure, John Lowe, III, Philip F. Zaccheo, and Harvey S. Feldman, 121
Design of Footing for Exposed Exterior Column, Yin-chow Chang, 352
Earth Pressures for Bilinear Backfill Surface, B. Satyanarayana, 295
Earthquake Stability of Slopes of Cohesionless Soils, H. Bolton Seed and Richard E. Goodman, 466
Engineering Measurements for Port Allen Lock, R. I. Kaufman and W. C. Sherman, Jr., 29
Field Observations of Structures Damaged by Settlement, Donald McKinley, 316
Fundamental Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 531
In-Situ Strength Characteristics of Soft Clays, I. Noorany and H. Bolton Seed, 323
Interpretation of the Consolidation Test, Carl B. Crawford, 13
Lateral Resistance of Piles in Cohesionless Soils, Bengt B. Broms, 475
Lateral Resistance of Piles in Cohesive Soils, Bengt B. Broms, 478
Lateral Response of Piles, William R. Spillers and Robert D. Stoll, 231
Lunar Problems in Soil Engineering, Ronald F. Scott, 710
Measuring Instruments for Strutted Excavating, Lauritis Bjerrum, T. Cameron Kenney, and B. Kjaernsli, 568
Methods of Estimating Settlement, T. William Lambe, 65
The Nature of Damping in Sands, Bobby O. Hardin, 299
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Pile and Pier Foundations, Ralph B. Peck, 224
Piles in Cohesionless Soil Subject to Oblique Pull, Yoshiaki Yoshimi, 229
Pore Pressure and Bearing Capacity of Layered Clays, T. Cameron Kenney, 462
Pore Water Pressures in Unsaturated Soils, Roy E. Olsen and Leonard J. Langfelder, 365
Preloading Results in Tank Foundation Economies, Louis J. Goodman and Norbert E. Faltyn, 843
Radial Drainage Oedometer for Laminated Clays, D. H. Shields and P. W. Rowe, 339

SOIL MECHANICS Continued
Self-Recording Soil Penetrometer, Bengt B. Broms and D. E. Broussard, 311
Settlement of Buildings on the MIT Campus, Harry M. Horn and T. William Lambe, 221
Shallow Foundations, George G. Meyerhof, 441
Shear Strength of a Soil After Freezing and Thawing, Bengt B. Broms and Leslie Y. C. Yao, 375
Shock-Induced Stress Wave Propagation in Sand, Ernest T. Selig and Eben Vey, 125
Shock Waves in Granular Soil, Robert D. Stoll and Ibrahim A. Ebeido, 459
Soil Surface Compaction with a Foam-Type Explosive, L. J. Goodman, A. R. Aidun, and C. S. Grove, Jr., 534
Some Swelling Characteristics of Compacted Clays, James V. Parcher and Ping-Chuan Lin, 641
Stability of Slopes in Anisotropic Soils, Kwan Yee Lo, 518
State-of-the-Art of Floating Foundations, Hugh Q. Golder, 327
Stochastic Model for Predicting Subsidence, Arnold L. Sweet and John L. Bogdanoff, 59
The Structural Action of Pile Cluster Dolphins, David G. Elms and Werner E. Schmid, 816
Subsurface Stabilization of Organic Silty Clay by Precompression, Ernest Jonas, 242
Texas—Houston Airport, a Study in Engineer-Contractor Harmony, H. O. Fischer, 553
Tolerance of Structures to Settlement, Jacob Feld, 398
Validity of a Stochastic Model for Predicting Subsidence, Arnold L. Sweet, 783
Yielding and Locking of Confined Sand, Robert V. Whitman, T. Edmond, and Peter J. Moore, 197

SPACE EXPLORATION
Apollo-A Trip to the Moon—Symposium, (2) Design of the Vertical Assembly Building, Anton Tedesko, 53
Apollo-A Trip to the Moon—Symposium, (3) Vertical Assembly Building—Design of Foundations, Philip C. Rutledge, 67
Apollo—A Trip to the Moon—Symposium, (1) Vertical Assembly Building—Project Description, Organization, and Procedures, William D. Alexander, 11
Engineering Challenges of Lunar Exploration, Daniel L. Lycan, 726

SPECIFICATIONS
Changed Conditions Clause in Construction Contracts, Robert F. Borg, 118
Designing Specifications—A Challenge, Edward A. Abdun-Nur, 604
Legal Aspects of Quality Control, Robert B. Jarvis, 600

SPILLWAYS
Boundary Layer Development and Spillway Energy Losses, Frank B. Campbell, Robert C. Cox, and Marden B. Boyd, 872
Irrotational Flow Over Spillways of Finite Height, John J. Cassidy, 866
Nappe Oscillation, H. Ivan Schwartz, 71
Spillway Discharge Coefficients for Rock Island Dam, Claud C. Lomax, 539
Straight Drop Spillway Stilling Basin, Charles A. Donnely and Fred W. Blaisdell, 732

STADIUMS
Texas—Unusual Dome Awaits Baseball Season in Houston, Louis O. Bass, 47

STATISTICAL ANALYSIS
Designing Specifications—A Challenge, Edward A. Abdun-Nur, 604
Double Summation of Errors in Aerial Triangulation, Gordon Gracie, 527
Turbulent Mixing Phenomena of Ocean Outfalls, Richard J. Frankel and James D. Cumming, 728

STEELS
Analysis of Bolted Butt Joints, John W. Fisher and John L. Rumpf, 738
Analysis of Multicell Box Gates for Dry Docks, Mohamed Ali El-gaaly, 435
Arecibo Radar-Radar Telescope—Design and Construction, Thomas C. Kavanagh and David H. H. Tung, 625
Calibration Tests of A490 High-Strength Bolts, Gordon H. Sterling, Emile W. J. Troup, Eugene Chesson, Jr., and John W. Fisher, 583
Canada—Toronto Office-Building Complex Breaks Records, John L. Kellermann, 368
Cold-Form Steel Members for Economy and Easy Assembly, Paul Buker, 363
Colorado—70-ft Underpasses of Corrugated Steel Pipe for Broadmoor Hotel, Colorado Springs, Nick Pinello, 638
Criteria for Designing Bearing-Type Bolted Joints, John W. Fisher and Lynn S. Beedle, 751

STEELS Continued
Dynamic Changes of Mode in Rigid-Plastic Structures, Barry Rawlings, 176
Effect of Large Alternating Strains on Steel Beams, Vitelmo V. Bertero and Egor P. Popov, 481
Expanding a Prestressed Concrete Plant, George Laszlo, 259
Flange Local Buckling in Wide-Flange Shapes, Maxwell G. Lay, 806
Flexural Strength of Steel and Concrete Composite Beams, Roger G. Slutter and George C. Driscoll, 823
Florida—Liaison Insures Quality Control for Vehicle Assembly Building at Cape Kennedy, Charles I. Orr, 773
Grain Size and Loading Effects on Steel, Russel C. Jones and John A. Hribar, 56
High Strength Bolted Moment Connections, Richard T. Douty and William McGuire, 565
High-Strength Bolts Subjected to Tension and Shear, Eugene Chesson, Jr., Norberto L. Faustino, and William H. Munse, 588
Inelastic Buckling of Steel Frames, Le-Wu Lu, 870
Inelastic Steel Beams Under Uniform Moment, Maxwell G. Lay and Theodore V. Galambos, 832
Loading Effects in Structural Steel Design, Richard N. Wright and William J. Hall, 195
Missouri—St. Louis Steel Arch, Symbol of the Spirit of the Pioneers, J. E. N. Jensen, 594
The Prestressed Glued Joint for Steel Connections, George Kostro, 294
Quality Controls for Steel Construction, Milton Brumer 608
Shakedown Analysis of Some Typical One-story Bents, Egor P. Popov and Eric Becker, 186
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766
Strength of Round Steel Columns, Theodore V. Galambos, 257
Studies of the Ductility of Steel Structures, Theodore V. Galambos and Maxwell G. Lay, 812
Torsional-Flexural Buckling of Thin-Walled Members, Alexander Chajes and George Winter, 815
Yielding of Uniformly Loaded Steel Members, Maxwell G. Lay, 800

STIFFNESS
Dynamic Behavior of Massive Guy Cables, Alan G. Davenport and George N. Steels, 511
Yielding of Uniformly Loaded Steel Members, Maxwell G. Lay, 800

STILLING BASINS
Straight Drop Spillway Stilling Basin, Charles A. Donnelly and Fred W. Blaisdell, 732

STOCHASTIC PROCESS
Stochastic Model for Predicting Subsidence, Arnold L. Sweet and John L. Bogdanoff, 59

STRAINS
Large Strain Analysis and Stresses in Linear Materials, August J. Durelli and Alfred P. Mulzet, 139
A Method to Increase the Accuracy of Moiré Method, Fu-Pen Chiang, 251

STREAMS
BOD and Oxygen Relationships in Streams, William E. Dobbins, 225
Experiments on Small Streams in Alluvium, Peter Ackers, 373

STRENGTH OF MATERIALS
Analysis of Bolted Butt Joints, John W. Fisher and John L. Rumpf, 738
Importance of Strain Hardening in Plastic Design, Alexander P. Hrennikoff, 856

STRESSES
Elastostatic Problem of a Perforated Square Plate, Alois L. Schlack and Robert W. Little, 51
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279
Pore Water Pressures in Unsaturated Soils, Roy E. Olsen and Leonard J. Langfelder, 365
Shock-Induced Stress Wave Propagation in Sand, Ernest T. Selig and Eben Vey, 125
Stresses in Hypterboloids under Edge Loadings, David G. Elms, David P. Billington, and Robert Mark, 498
Welded Connections for Space Frame Joints, Robert H. Goldsmith, 712
Yielding and Locking of Confined Sand, 197

STRUCTURAL ENGINEERING
Alaska—Vertical Forces in Earthquake of March 1964, Harvey P. Pittelko, 49
Analysis of Bolted Butt Joints, John W. Fisher and John L. Raumpf, 738
Analysis Comparisons for Single Curved Shell Roofs, Paul E. Mast, 790

STRUCTURAL ENGINEERING Continued
Analysis of Multicell Box Gates for Dry Docks, Mohamed Ali El-gaaly, 435
Analysis of Truss-Plate Structures, James W. Gillespie, 551
Anchor Zone Stresses in Prestressed Concrete Beams, Pijushkanti Som and Kalyanmay Ghosh, 94
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854
Behavior of Restrained Reinforced Concrete Columns, Edward O. Pfrang and Chester P. Siess, 341
Bolted Bridge Behavior During Erection and Service, Eugene Chesson, Jr., 120
Buckling of Three-Legged Columns with Batten Bracing, Jorge Y. Tamayo and Morris Ojalvo, 419
Calibration Test of A490 High-Strength Bolts, Gordon H. Sterling, Emile W. J. Troup, Eugene Chesson, Jr., and John W. Fisher, 583
Ceramics as Structural Materials, Francis R. Shanley and William J. Knapp, 403
Cold-Formed Steel Members for Economy and Easy Assembly, Paul Buker, 363
Combined Aerodynamic and Structural Design of Lightweight Flight Structures, Robert W. Fralich, 505
Computer System Designed for Teaching and Structural Research at MIT, William Litle and Kenneth Reinschmidt, 542
Criteria for Designing Bearing-Type Bolted Joints, John W. Fisher and Lynn S. Beedle, 751
Crushable Materials for Structural Blast Shields, Martin A. Salmon and Carl J. Costantino, 191
Deflections of Multiple-Panel Reinforced Concrete Floor Slabs, Mortimer D. Vanderbilt, Mete A. Sozen, and Chester P. Siess, 769
Design of Aluminum Tubular Members, John W. Clark and Richard L. Rolf, 271
Details that Cause Failure in Timber Truss Design, Paul Gordon, 667
Direct Design of Framed Structures, John F. Brotchie, 37
Dynamic Behavior of Massive Guy Cables, Alan G. Davenport and George N. Steels, 511
Dynamic Structural Analysis with Short Time History, George L. Henderson, 253
Earthquake Response of Systems with Bilinear Hysteresis, Spiro S. Thomaides, 26
Earthquake Response of a Yielding Structure, Paul C. Jennings, 453
Effect of Large Alternating Strains on Steel Beams, Vitelmo V. Bertero and Egor P. Popov, 481
Experimental Rotation of Steel Beam-Columns, Giuliano Augusti, 291
Face-Wrinkling Mode of Buckling of Sandwich Panels, Billy J. Harris and W. C. Crisman, 575
Flange Local Buckling in Wide-Flange Shapes, Maxwell G. Lay, 806
Flexural Strength of Steel and Concrete Composite Beams, Roger G. Slutter and George C. Driscoll, 823
Florida—Criteria for Construction in Creating Another Cape Kennedy Colossus, George H. Kirkland, 694
Frames of Solid Bars of Varying Cross Sections, Edward J. Krynicki and Zbigniew E. Mazurkiewicz, 716
Geometry of Suspended Cloth Roofs, Avinadav Siev, 859
Guide to Development and Use of Electronic Computer Programs: Computers and Programming, Charles L. Miller and Steven J. Fenves, 3
Guide to Development and Use of Electronic Computer Programs: Introduction, Steven J. Fenves, 261
Guide to Development and Use of Electronic Computer Programs: Program Planning, Steven J. Fenves, 15
High Strength Bolted Moment Connections, Richard T. Douty and William McGuire, 565
High-Strength Bolts Subjected to Tension and Shear, Eugene Chesson, Jr., Norberto L. Faustino, and William H. Munse, 588
Importance of Strain Hardening in Plastic Design, Alexander P. Hrennikoff, 856
Inelastic Buckling of Steel Frames, Le-Wu Lu, 870
Inelastic Steel Beams Under Uniform Moment, Maxwell G. Lay and Theodore V. Galambos, 832
Influence Functions for Beams on Elastic Foundations, Alexander Dodge, 102
Influence Lines for Beams on Elastic Foundations, K. T. Sundara Raja Iyengar and S. Anantharamu, 643
Interaction of Shear Walls and Frames, Fazlur R. Khan and John A. Sbarounis, 247
Loading Effects in Structural Steel Design, Richard N. Wright and William J. Hall, 195

STRUCTURAL ENGINEERING Continued
Masonry Walls on Continuous Beams, Saky Rosenhaupt and Yehuda Sakal, 504
Membrane Forces and Buckling in Reticulated Shells, Douglas T. Wright, 279
Misalinement in Bolted Joints, Desi D. Vasarhelyi and William N. Chang, 460
Missouri—Arc Welding Speeds Construction of Springfield Office Building, Rudolph F. Fischl and Georg Klatte, 133
On Composite Beams, William R. Spillers, 836
Operational Method for Continuous Beams, Bennosuke Tanimoto, 423
Optimum Structural Design Using Linear Programming, Fred Moses, 171
Optimum Synthesis of Prestressed Structures, George I. N. Rozvany, 157
Plastic Analysis and Design of Non-Prismatic Members, Bruce G. Rogers and William H. Munse, Jr., 366
Plastic Behavior of Tubular Beam Columns, Timothy J. Dwyer and Theodore V. Galambos, 537
Predicting Structural Behavior Analytically, Edward O. Pfrang and Chester P. Siess, 289
Probabilistic Design to Resist Earthquakes, Emilio Rosenblueth, 112
Reinforcing for a Rectangular Opening in a Plate, Robert R. Snell and Marion B. Scott, 463
Research in Soil Structure Interaction, William J. Flathau, 502
Seismic Study of Arch Dams, J. Laginha Serafim and J. Oliveira Pedro, 590
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766
Steel Fabrication Drawings by Computer, Alfred H. Palmer and Herbert T. Blomquist, 116
Strength of Round Steel Columns, Theodore V. Galamos, 257
Stresses in a Uniformly Loaded Two-Layer Circular Plate, Martin A. Goldberg, Malcolm Newman, and Marvin J. Forray, 652
Structural Maintenance—the Third Element in the Structural Engineer's Professional Package, T. C. Kavanagh and S. M. Johnson, 309
Studies of the Ductility of Steel Structures, Theodore V. Galambos and Maxwell G. Lay, 812
A Study of Mechanisms with Application to Frames, Jacques E. Benveniste, 446
Teaching Engineering Attitude to Students, Malcolm S. Gregory, 361
Thermal Stresses due to Unequal Thermal Coefficients of Concrete and Reinforcing Steel, T. A. Holm, 144
Tilt and Deflections of Tapered Polygonal Towers, Ralph J. Pschunder, 143
Torsional-Flexural Buckling of Thin-Walled Members, Alexander Chajes and George Winter, 815
Torsion of Structural Shapes, I. A. El Darwish and Bruce G. Johnston, 428
Ultimate Strength of Reinforced Concrete Flat Slabs, Morris W. Self, 27
Vibration of Towers as Related to Wind Pulses, Arthur N. L. Chiu and Donald A. Sawyer, 108
Washington—Legacy of Galloping Gertie (Tacoma Narrows Bridge), Robert Goller, 704
Welded Connections for Space Frame Joints, Robert H. Goldsmith, 712
Wind Loads on Basic Dome Shapes, F. J. Maher, 103
Wood Beams Prestressed with Bonded Tension Elements, John Peterson, 379
Yielding of Uniformly Loaded Steel Members, Maxwell G. Lay, 800

STRUTS
Buckling Loads for Elastically Supported Struts, A. Raymond Toakley, 168

SUBSIDENCE
Differential Settlement at Selfridge Air Force Base, George B. Wallace and William C. Otto, 70
Validity of a Stochastic Model for Predicting Subsidence, Arnold L. Sweet, 783

SUBSURFACE STRUCTURES
Avoiding Utility Interference Underground, Hertel Missimer, 557

SURVEYING
Arctic Siting and Surveying, Max O. Laird, 829
The Case of the Missing Curriculum, Kenneth S. Curtis, 700
Double Summation of Errors in Aerial Triangulation, Gordon Gracie, 527
Generalized Resection Method in Surveying, K. C. Chakko, 421
Highway Plans from Photogrammetrically-Compiled Maps, Lewis E. Parker, 364
Measuring Structural Behavior of Glen Canyon Dam, Joe T. Richardson, 410
Photogrammetric Measurement of Tidal Currents, Joseph E. Waugh, 35

SURVEYING Continued
Preserving Survey Monuments Despite Highway Construction, Winfield H. Eldridge, 321
Reservoir Topography by Shoreline Plotting, David L. Crandall, 579
STADIA—an Automatic Data Input Assembler for Topographic Surveys, Paul D. Spindel, 580
Surveying and Mapping for Water Resource Planning, Kurt W. Bauer, 19
Vertical Control on the Great Lakes, Gilbert E. Ropes, 561

SUSPENSION BRIDGES
Washington—Legacy of Galloping Gertie (Tacoma Narrows Bridge), Robert Goller, 704

TANKS
Mounting Plate Glass in Sides of Flumes and Tanks, Elton F. Daly, 586
Preloading Results in Tank Foundation Economies, Louis J. Goodman and Norbert E. Faltyn, 843
Storage Containers for Liquefied Natural Gas, P. J. Anderson and A. R. Khan, 516

TELEVISION
New Jersey—A Revolution in Sewer Maintenance at Woodbridge, Charles W. Beagle, 141

TERMINALS
Transportation Centers, Wilbur S. Smith, 137

TESTING
Behavior of Fasteners and Plates with Holes, John W. Fisher, 854
Boundary Layer Development and Spillway Energy Losses, Frank B. Campbell, Robert C. Cox, and Marden B. Boyd, 872
Buckling of Long Unsupported Timber Piles, Earle J. Klohn and G. T. Hughes, 235
Calibration Test of A490 High-Strength Bolts, Gordon H. Sterling, Emile W. J. Troup, Eugene Chesson, Jr., and John W. Fisher, 583
California—Rapid-Transit Test Track for San Francisco, Leslie A. Irvin, 496
Canal Discharge Measurements with Radioisotopes, Jack C. Shuster, 359
Capacity Tests in Large Concrete-Lined Canals, Paul J. Tilp, 846
Compartmentalization of Aeration Tanks, William F. Milbury, Wesley O. Pipes, and Robert B. Grieves, 748
Consolidation Testing with Back Pressure, John Lowe, III, Philip F. Zaccheo, and Harvey S. Feldman, 121
Coupled Vibrations of Thin-Walled Elastic Bars, Wai Keung Tso, 175
Designing Specifications—A Challenge, Edward A. Abdun-Nur, 604
Dynamic Behavior of Massive Guy Cables, Alan G. Davenport and George N. Steels, 511
Effect of Large Alternating Strains on Steel Beams, Vitelmo V. Bertero and Egor P. Popov, 481
Elastic Stability of Radially Nonhomogeneous Rings, S. Russell Keim, 786
Flow Characteristics of PVC Sewer Pipe, Lawrence C. Neale and Robert E. Price, 840
Fundamental Aspects of the Atterberg Limits, H. Bolton Seed, Richard J. Woodward, and Raymond Lundgren, 531
High-Strength Bolts Subjected to Tension and Shear, Eugene Chesson, Jr., Norberto L. Faustino, and William H. Munse, 588
Hydraulic Design of Pump Intakes, Ralph T. Hattersley, 347
Hydraulic Testing of the 24-in. Leidy Line, Denver S. Patton, Jr., 656
Importance of Strain Hardening in Plastic Design, Alexander P. Hrennikoff, 856
In-Situ Strength Characteristics of Soft Clays, I. Noorany and H. Bolton Seed, 323
Interpretation of the Consolidation Test, Carl B. Crawford, 13
Lateral Pressure of Concrete on Formwork, R. L. Peurifoy, 679
Lunar Problems in Soil Engineering, Ronald F. Scott, 710
Masonry Walls on Continuous Beams, Saky Rosenhaupt and Yehuda Sakal, 504
Plastic Behavior of Tubular Beam Columns, Timothy J. Dwyer and Theodore V. Galambos, 537
Measurement of Ruffled Water Surface Elevation, A. J. Raudkivi, 288
Methods of Estimating Settlement, T. William Lambe, 65
The Nature of Damping in Sands, Bobby O. Hardin, 299
Permeability of Compacted Clay, James K. Mitchell, Don R. Hooper, and Richard G. Campenella, 647
Piles in Cohesionless Soil Subject to Oblique Pull, Yoshiaki Yoshimi, 229
Pore Water Pressures in Unsaturated Soils, Roy E. Olsen and Leonard J. Langfelder, 365
Quality Control in Construction, W. O. Hiltabidle, Jr., Bradford N. Clark,

TESTING Continued
Charles E. Schaffner, John Nelson Linn, Ralph E. De Simone, Arnold H. Vollmer, Elmer B. Isaak, Leslie D. Long, Richard Q. Praeger, Hal W. Hunt, 660
Radial Drainage Oedometer for Laminated Clays, D. H. Shields and P. W. Rowe, 339
Rock Trap Experience in Unlined Tunnels, John J. Mattimoe, E. Roy Tinney, and W. Weston Wolcott, 33
Second Order Equation for BOD, James C. Young and John W. Clark, 267
Shear Strength of High-Strength Bolts, James J. Wallaert and John W. Fisher, 766
Shock Waves in Granular Soil, Robert D. Stoll and Ibrahim A. Ebeido, 459
Some Swelling Characteristics of Compacted Clays, James V. Parcher and Ping-Chuan Lin, 641
Stability of Structures with Small Imperfections, John Roorda, 63
Study of Static Pressure Along a Rough Boundary, J. L. Chao and Virgil A. Sandborn, 337
Subsurface Stabilization of Organic Silty Clay by Precompression, Ernest Jonas, 242
Tests Verify Design for TVA's 500-kv Towers, Gene M. Wilhoite, 90
Ultimate Strength of Reinforced Concrete Flat Slabs, Morris W. Self, 27
Water Hammer Resulting From Cavitating Pumps, M. R. Carstens and T. W. Hagler, Jr., 277

THERMOELECTRIC POWER GENERATION
Georgia—River Bypass Boosts Efficiency of Power Plant on Chattahoochee River, 714

TIDES
Photogrammetric Measurement of Tidal Currents, Joseph E. Waugh, 35
Simple Apparatus for Producing Model Tides, Johan Albert Zwamborn, 283
Tidal Characteristics of Two Estuaries in Florida, William B. Stelzenmuller, 545
Yearly Sea Level Variations for the United States, Steacy D. Hicks and William Shofnos, 456

TILES
Tile Drainage Performance, Coachella Valley, California, Arthur F. Pillsbury, J. R. Spencer, William R. Johnston, and L. O. Weeks, 9
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham and E. Robert Baumann, 514

TIMBER CONSTRUCTION
Utah—A National Forest at Vernal Goes Modern, D. G. Dalley, 768

TIMBER (Structural)
Details that Cause Failure in Timber Truss Design, Paul Gordon, 667

TOPOGRAPHY
STADIA—an Automatic Data Input Assembler for Topographic Surveys, Paul D. Spindel, 580

TOPOLOGY
Network Analysis of Structures, Frank L. Di Maggio and William R. Spillers, 122

TORSION
Torsion of Structural Shapes, I. A. El Darwish and Bruce G. Johnston, 428

TOWERS
Buckling of Three-Legged Columns with Batten Bracing, Jorge Y. Tamayo and Morris Ojalvo, 419
Dynamic Behavior of Massive Guy Cables, Alan G. Davenport and George N. Steels, 511
Florida—Criteria for Construction in Creating Another Cape Kennedy Colossus, George H. Kirkland, 694
Steel Offshore Towers as Navigation Aids, J. V. Ruffin, 645
Tests Verify Design for TVA's 500-kv Towers, Gene M. Wilhoite, 90
Tilt and Deflections of Tapered Polygonal Towers, Ralph J. Pschunder, 143
Vibration of Towers as Related to Wind Pulses, Arthur N. L. Chiu and Donald A. Sawyer, 108
Virginia—Construction of Chesapeake Light Station, John W. Fowler, 650
Virginia—Towers for a 500-kv Transmission Line, S. D. Alpert and J. D. Shaw, 123

TRACERS
Dispersion Measurement in Open Channels, Calvin C. Patterson and Earnest F. Gloyna, 46

TRAFFIC
Traffic Accident Study on Milwaukee Expressway, Bruce A. Lind and H. Hong, 810

TRANSMISSION LINES
Canada—Hydro Development of the Manicouagan and Outardes Rivers in Quebec, Benoit Baribeau, 744
Short Span Sag Calculations with Insulator Bells, Thomas E. Leland, 127

TRANSMISSION LINES Continued
Virginia—Towers for a 500-kv Transmission Line, S. D. Alpert and J. D. Shaw, 123

TRANSPORTATION
Airports and Transit Systems—the Engineer's Challenge, J. K. Carr, 233
Duplicate Locks for Illinois Waterway, William J. Santina and George B. Wesler, 159
Engineering Principles of Urban Transportation Planning, Kurt W. Bauer, 821
Factors Considered in Urban Transportation Planning, Charles G. Beer, 874
Functional Planning of Bulk Material Ports, Leonard S. Oberman, 88
Interstate = Benefits (Lives + Dollars), Frank Schneller, 313
Planning Public Mass Transportation, Henry D. Quinby, 827
Transportation Centers, Wilbur S. Smith, 137

TRIANGULATION
Double Summation of Errors in Aerial Triangulation, Gordon Gracie, 527
Generalized Resection Method in Surveying, K. C. Chakko, 421

TRUSSES
Analysis of Truss-Plate Structures, James W. Gillespie, 551
Details that Cause Failure in Timber Truss Design, Paul Gordon, 667

TUBES
Dynamic Response of a Tube Under Moving Pressure, Sing-chih Tang, 730

TUNNELING (Excavation)
Colorado—Reclamation Firsts: Underground Power Plant at Morrow Point Dam, B. P. Bellport, 105
Contractor's View on Unlined Tunnels, Alfred M. Petrofsky, 43
Machine Tunneling on Missouri River Dams, Lloyd B. Underwood, 780
Rock Trap Experience in Unlined Tunnels, John J. Mattimoe, E. Roy Tinney, and W. Weston Wolcott, 33
Tunnels for Hydroelectric Power in Tasmania, Henry H. Thomas and Lindsay S. Whitman, 84
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, H. E. Dann, W. P. Hartwig, and J. R. Hunter, 17
Unlined Tunnels of the Souther California Edison Company, Ralph W. Spencer, Bruce R. Laverty, and Dean A. Barber, 73

TURBINES
Flow Measurements at Columbia River Power Plants, Nicholas A. Dodge, 760

TURBULENCE
Submerged Hydraulic Jump, Nallamuthu Rajaratnam, 633
Turbulence Measured by Electrokinetic Transducers, Hsing Chuang and Jack E. Cermak, 743
Wind Driven Water Currents, W. Douglas Baines and Douglas J. Knapp, 788

UNDERGROUND STORAGE
Storage Containers for Liquefied Natural Gas, P. J. Anderson and A. R. Khan, 516

UNDERPASSES
Colorado—70-ft Underpass of Corrugated Steel Pipe for Broadmoor Hotel, Colorado Springs, Nick Pinello, 638

UNIONS
To Bargain or Not to Bargain, E. Lawrence Chandler, 492
Collective Bargaining for Municipal Engineers, Herman P. Zanoni, 577

URBAN PLANNING
Airports and Transit Systems—the Engineer's Challenge, J. K. Carr, 233
Avoiding Utility Interference Underground, Hertel Missimer, 557
Engineering Principles of Urban Transportation Planning, Kurt W. Bauer, 821
Factors Considered in Urban Transportation Planning, Charles G. Beer, 874
Jackson, Miss. in 2039 A. D., 252
Planning a National Airport System to Serve the 70's, Cole Morrow, 512
Planning Public Mass Transportation, Henry D. Quinby, 827
Reactor Containment and Environmental Considerations, Raymond O. Brittan, 315
Transportation Centers, Wilbur S. Smith, 137
Urban Atmospheric Pollution, Albert F. Bush, 325

U. S. GOVERNMENT
A New and Better Foreign Technical Assistance Program, John S. Hale, 439

U. S. NAVY
Chile—Seabees Give Technical Assistance in Chile, Leroy D. Lawson, 110
Military Engineering in Vietnam, Peter A. Corradi, 617

UTILITIES
Alaska—Utilities for a Relocated Town in Valdez, James W. Poirot, 173
Avoiding Utility Interference Underground, Hertel Missimer, 557
Canada—Winnipeg Favors Utility Construction in Winter, W. S. Brock, 442

VELOCITY
Photogrammetric Measurement of Tidal Currents, Joseph E. Waugh, 35

VIBRATION
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, J. C. McCraw, 634
Dynamic Response of a Tube Under Moving Pressure, Sing-chih Tang, 730
Flow-Induced Vibrations—Experience of TVA with Hydraulic and Other Structures, James T. Price, 245
Nappe Oscillation, H. Ivan Schwartz, 71
On the Shock Response of Inelastic Beams, Kenneth E. Blanchard and Albert B. Schultz, 655
Random Vibration of a Beam Column, Masanobu Shinozuka and L. Henry, 611
Vibration of Towers as Related to Wind Pulses, Arthur N. L. Chiu and Donald A. Sawyer, 108
Vibrations and Stability of Buckled Panels, Yao W. Chang and Ernest F. Masur, 755

WAREHOUSES
Composite Design Cuts Cost of Small Warehouse, Edward B. Finkel, 469

WASTE DISPOSAL
Compartmentalization of Aeration Tanks, William F. Milbury, Wesley O. Pipes, and Robert B. Grieves, 748
Environmental Hazards of Radioactive Wastes, Joe O. Ledbetter, 615
Evaluation of Two Aerated Lagoons, Ross E. McKinney and Henry H. Benjes, Jr., 842
An Oxidation Pond as a Tertiary Treatment Device, Raymond C. Loehr and Ralph L. Stephenson, 877

WASTES
Two-Dimensional Infiltration and Wetting Fronts, Sadik Toksoz, Don Kirkham and E. Robert Baumann, 514

WATER CONSUMPTION
Effects of Competition on Efficiency of Water Use, Jay M. Bagley, 547
Irrigation Water Requirements in Texas, Charles B. Thompson, 200

WATER DISTRIBUTION
Effects of Competition on Efficiency of Water Use, Jay M. Bagley, 547

WATER FLOW
Computer Analysis of Overland Flow, James R. Morgali and Ray K. Linsley, 857
Irrotational Flow Over Spillways of Finite Height, John J. Cassidy, 866
Large-Scale Roughness in Open-Channel Flow, John B. Herbich and Sam Shulits, 386
River Flood Flows, Forecasts and Probabilities, Michael C. Quick, 546
Solution of Highly Curvilinear Gravity Flows, Theodor S. Strelkoff, 355
Withdrawal from Two-Layer Stratified Flows, Donald R. F. Harleman and Rex A. Elder, 764

WATER HAMMER
Water Hammer Resulting From Cavitating Pumps, M. R. Carstens and T. W. Hagler, Jr., 277

WATER POLLUTION
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
A Lawyer Looks at Stream Pollution, William Gross, 243
Missouri—Pollution Abatement Program for Kansas City, Glen J. Hopkins, 571
Washington—Seattle's Record-Breaking Sewage-Treatment System, Fred E. Lange, 151

WATERPROOFING
Waterproofing Below the Ground Line, Thaddeus R. L. Lazarr, 400

WATER QUALITY
Estuarine Water Quality Management and Forecasting, Robert V. Thomann and Matthew J. Sobel, 808
Folklore in Water Quality Standards, P. H. McGauhey, 412
Future Quantity and Quality of Colorado River Water, Raymond A. Hill, 837
Operating a Sea Water Barrier Project, Arthur E. Bruington and Frederick D. Seares, 636
Progress in Waste Water Re-Use in Southern California, John D. Parkhurst, 569

WATER RESOURCES
Determining Bank Storage of Lake Mead, Paul A. Rechard, 639

WATER RESOURCES Continued
Development of Ground Water in Hawaii, Leslie J. Watson, 401
Educational Requirements for Water Resource Engineers, Alfred R. Golzé, 606
Future Quantity and Quality of Colorado River Water, Raymond A. Hill, 837
Irrigation in India: Past and Present, Asit K. Biswas, 523
Nuclear Craters for Water Resources Development and Management, David K. Todd, 329
Quality Aspects of Waste Water Reclamation, Paul R. Bonderson, 169
A Revolution in the Water Resources Field, William Whipple, Jr., 750
Sequential Generation of Rainfall and Runoff Data, Ven Te Chow and S. Ramaseshan, 696
Surveying and Mapping for Water Resource Planning, Kurt W. Bauer, 19
Trend in Water Resources Education, Carl E. Kindsvater, 369
Use of Interrelated Records to Simulate Streamflow, Leo R. Beard, 559
Water for the World, M. D. Morris, William E. Wood, James J. Geraghty, James Gould, Gordon R. Williams, Donald F. Othmer, Donald R. Lueder, Malcolm Pirnie, Jr., and Arthur C. Ford, 802

WATER SUPPLY
Alabama—Paddle Wheels for Traction in a Swamp, 691
California—California Water Project, Power Plans and Demands, Alfred R. Golzé, 100
California—Planning and Anchoring 12 Miles of Big Pipe for Santa Clara County, M. K. Harris, 345
California—Steel Pipe for South Bay Aqueduct, Alfred R. Golzé, 166
Combination Water Systems for High-Rise Buildings, G. D. Testin, 232
Development of Ground Water in Hawaii, Leslie J. Watson, 401
East Pakistan—Master Plan for Water and Power Development, Ernest M. Bowles, 483
Water Renovation—Some Advanced Treatment Processes, David G. Stephan, 563
Water Supply for Saigon, Walter T. McPhee, 426

WATER TREATMENT
Design Aspects of Lompoc Water Treatment Plant, Charles H. Lawrance, 275
Folklore in Water Quality Standards, P. H. McGauhey, 412
Progress in Waste Water Re-Use in Southern California, John D. Parkhurst, 569
Theory of Water Filtration, Thomas R. Camp, 1
Water Renovation—Some Advanced Treatment Processes, David G. Stephan, 563
Water Supply for Saigon, Walter T. McPhee, 426

WATERWAYS
Barge Docks for Inland Waterways, William L. Horstman, 703
Duplicate Locks for Illinois Waterway, William J. Santina and George B. Wesler, 159
Foreshore Protection, Lower Mississippi River, Rudolf Hertzberg, 573
High Lift Locks: Some Hydraulic Problems and Solutions, Ernest Pariset and André Gagnon, 131
Influence of Soil Types on Stabilization of the Savannah River, William J. Wall, 717
Nuclear Excavation of a Sea-Level Isthmian Canal, Luke J. Vortman, 209
Stability of Channels by Armorplating, Dasel E. Hallmark and George L. Smith, 796
Tidal Characteristics of Two Estuaries in Florida, William B. Stelzenmuller, 545

WAVES
Model for Wave Motions in Axi-Symmetric Solids, Alfredo H. S. Ang and Johann H. Rainer, 266
Shock-Induced Stress Wave Propagation in Sand, Ernest T. Selig and Eben Vey, 125
Shock Waves in Granular Soil, Robert D. Stoll and Ibrahim A. Ebeido, 459
Wave-Induced Oscillations in Harbors, Frederic Raichlen and Arthur T. Ippen, 183

WEIRS
Nappe Oscillation, H. Ivan Schwartz, 71
New Type Weir Construction for Small Watersheds, Neal E. Minshall and Ralph G. Spomer, 189
Solution of Highly Curvilinear Gravity Flows, Theodor S. Strelkoff, 355

WELDING
Missouri—Arc Welding Speeds Construction of Springfield Office Building, Rudolph F. Fischl and Georg Klatte, 133
Welded Connections for Space Frame Joints, Robert H. Goldsmith, 712

WELDING Continued
Welding Codes Updated, addenda issued to AWS Building Code and Bridge Specification, 349

WELLS
Boundary Flow Considerations in the Design of Wells, Mostafa M. Soliman, 391
Exact Free Surface of Gravity Wells, Abdel-Aziz I. Kashef, 798
Modified Solutions for Decreasing Discharge Wells, Mahmoud A. Abu-Zied, Verne H. Scott, and Gert Aron, 707
Operating a Sea Water Barrier Project, Arthur E. Bruington and Frederick D. Seares, 636
Simplified Solution for Decreasing Flow in Wells, Gert Aron and Verne H. Scott, 675

WIND (Air Movement)
Vibration of Towers as Related to Wind Pulses, Arthur N. L. Chiu and Donald A. Sawyer, 108
Wind Driven Water Currents, W. Douglas Baines and Douglas J. Knapp, 788
Wind Loads on Basic Dome Shapes, F. J. Maher, 103

ZONING
The Airport and its Approaches, James R. Carr and John R. Eva, 593

AUTHOR INDEX

(including Memoirs of deceased members)

ABDUN-NUR, EDWARD A.
Designing Specifications—A Challenge, 604

ABU-ZIED, MAHMOUD A.
Modified Solutions for Decreasing Discharge Wells, with Verne H. Scott and Gert Aron, 707

ACHENBACH, JAN D.
Dynamic Response on Viscoelastic Subgrade, with Chin-teh Sun, 602

ACKERMANN, NORBERT L.
Salt-Water Interface Near a Fresh-Water Canal, with Pachern Sridurongkatum, 38
Viscous and Boundary Effects on Virtual Mass, with Anat Arbhabhirama, 230

ACKERS, PETER
Experiments on Small Streams in Alluvium, 373

ADAMS, JOHN MIDDLETON
Memoir of, 885

AHLBORN, GALE
See Robert Horonjeff

AHLVIN, RICHARD G.
Stress Repetitions in Pavement Design, with Donald N. Brown, 782

AIDUN, A. R.
See L. J. Goodman

ALEXANDER, WILLIAM D.
Apollo—a Trip to the Moon—Symposium, (1) Vertical Assembly Building—Project Description, Organization and Procedures, 11

ALI, IQBAL
See Robert B. Banks

ALPERT, S. D.
Virginia—Towers for a 500-kv Transmission Line, with J. D. Shaw, 123

ALTSCHAEFFL, ADOLPH G.
See Gerald A. Leonards

ANANTHARAMU, S.
See K. T. Sundara Raja Iyengar

ANDERSON, ALBERT E.
Snow Loads for Roofs, 474

ANDERSON, JAMES AYLOR
Memoir of, 886

ANDERSON, P. J.
Storage Containers for Liquefied Natural Gas, with A. R. Khan, 516

ANDERSON, ROBERT H.
Two Degree-of-Freedom Elastoplastic Response, 581

ANG, ALFREDO H.-S.
Analysis of Contained Plastic Flow in Plane Solids, with Goin N. Harper, 304
Model for Wave Motions in Axi-Symmetric Solids, with Johann H. Rainer, 266

APMANN, R. P.
See D. A. Parsons

APPEL, CHARLES A.
See Irwin Remson

ARBHABHIRAMA, ANAT
See Norbert L. Ackermann

ARON, GERT
Simplified Solution for Decreasing Flow in Wells, with Verne H. Scott, 675
See Mahmoud A. Abu-Zied

AU, LEWIS LI-TANG
Thermal-Shock Effects on a Space Vehicle, with Donald J. Trent, 525

AUGUSTI, GUILIANO
Experimental Rotation Capacity of Steel Beam-Columns, 291

AYRE, ROBERT S.
See Theodore R. Tauchert

BAGLEY, JAY M.
Effects of Competition on Efficiency of Water Use, 547

BAINES, W. DOUGLAS
Wind Driven Water Currents, with Douglas J. Knapp, 788

BALLOFFET, ARMANDO
Hydraulic Studies of Jamaica Bay, with Arnold Kupferman, 255

BANKS, ROBERT B.
Dispersion and Adsorption in Porous Media Flow, with Iqbal Ali, 690

BANTEL, EDWARD CHRISTIAN HENRY
Memoir of, 887

BARBER, DEAN A.
See Ralph W. Spencer

BARIBEAU, BENOIT
Canada—Hydro Development of the Manicouagan and Outardes Rivers in Quebec, 744

BASS, LOUIS O.
Texas—Unusual Dome Awaits Baseball Season in Houston, 47

BAUER, KURT W.
Engineering Principles of Urban Transportation Planning, 821
Surveying and Mapping for Water Resource Planning, 19

BAUMANN, E. ROBERT
See Sadik Toksoz

BEAGLE, CHARLES W.
New Jersey—A Revolution in Sewer Maintenance at Woodbridge, 141

BEAR, JACOB
Moving Interface in Coastal Aquifers, with Gedeon Dagan, 598

BEARD, LEO R.
Use of Interrelated Records to Simulat Streamflow, 559

BECKER, ERIC
See Egor P. Popov

BEEDLE, LYNN S.
See John W. Fisher

BEER, CHARLES G.
Factors Considered in Urban Transportation Planning, 874

BELLPORT, B. P.
Colorado—Reclamation Firsts: Underground Power Plant at Morrow Point Dam, 105

BENJES, HENRY H., JR.
See Ross E. McKinney

BENSON, MANUEL A.
Effect of Floods and Obsolescence on Bridge Life, with N. C. Matalas, 830

BENVENISTE, JACQUES E.
A Study of Mechanisms with Application to Frames, 446

BERGSTROM, RICHARD N.
Latest Developments in Transporting Coal by Rail, with Kenneth W. Hamming, 681
Has Nuclear Power Become Competitive?, 96

BERRY, DONALD S.
Technological Aspects of Urban Transportation, with Paul W. Shuldiner, 205

BERTERO, VITELMO V.
Effect of Large Alternating Strains on Steel Beams, with Egor P. Popov, 481

BEVERAGE, JOSEPH P.
Hyperconcentrations of Suspended Sediment, with James K. Culbertson, 430

BHATLA, MANMOHAN N.
Role of Protozoa in the Diphasic Exertion of BOD, with Anthony F. Gaudy, Jr., 507

BIEHN, F. O.
Florida—The Cross-Florida Barge Canal Under Construction, 371

BILLINGTON, DAVID P.
See David G. Elms

BISHOP, A. ALVIN
Total Bed Material Transport, with Daryl B. Simons and Everett V. Richardson, 471
See Yu-Si Fok

BISWAS, ASIT K.
The Hydrologic Cycle, 273
Irrigation in India: Past and Present, 523

BJERRUM, LAURITS
Measuring Instruments for Strutted Excavations, with Theodore C. Kenney and B. Kjaernsli, 568

BLAISDELL, FRED W.
See Charles A. Donnelly

BLANCHARD, KENNETH E.
On the Shock Response of Inelastic Beams, with Albert B. Schultz, 655

BLEICH, HANS H.
See Morton B. Friedman

BLOMQUIST, HERBERT T.
See Alfred H. Palmer

BOGDANOFF, JOHN L.
See Arnold L. Sweet

BOGARDI, JOHN L.
European Concepts of Sediment Transportation, 860

BONDERSON, PAUL R.
Quality Aspects of Waste Water Reclamation, 169

BORCHARD, EDWIN KENNEL
Memoir of, 888

BORG, ROBERT F.
Changed Conditions Clause in Construction Contracts, 118

BORG, SIDNEY F.
Heat Analysis—A Tensoral-Dimensional Approach, 825

BOUWER, HERMAN
Theoretical Aspects of Seepage from Open Channels, 377

BOWLES, ERNEST M.
East Pakistan—Master Plan for Water and Power Development, 483

BOYD, MARDEN B.
See Frank B. Campbell

BRAVERMAN, M. M.
New York City's Air Pollution Index, with C. Theophil, 265

BREDAR, WILLIAM L.
Colorado—Denver's Metro Waste Treatment Plant, 687

BREIMEISTER, HARRY
Memoir of, 888

BRITTAN, RAYMOND O.
Reactor Containment and Environmental Considerations, 315

BROCK, W. S.
Canada—Winnipeg Favors Utility Construction in Winter, 442

BROMS, BENGT B.
Design of Laterally Loaded Piles, 389
Lateral Resistance of Piles in Cohesionless Soils, 475
Lateral Resistance of Piles in Cohesive Soils, 478
Self-Recording Soil Penetrometer, with D. E. Broussard, 311
Shear Strength of a Soil After Freezing and Thawing, with Leslie Y. C. Yao, 375

BROOKS, HARVEY
Challenge to Civil Engineering, 344

BROTCHIE, JOHN F.
Direct Design of Framed Structures, 37

BROUSSARD, D. E.
See Bengt B. Broms

BROWN, DONALD N.
See Richard G. Ahlvin

BRUINGTON, ARTHUR E.
Operating a Sea Water Barrier Project, with Frederick D. Seares, 636

BRUMER, MILTON
Quality Control for Steel Construction, with Frank Stahl, 608

BRUTSAERT, WILFRIED
See Hassan Ali Ibrahim

BUGLIARELLO, GEORGE
Non-Newtonian Flows—Their Value in Civil Engineering, 509

BUKER, PAUL
Cold-Formed Steel Members for Economy and Easy Asembly, 363

BUSH, ALBERT F.
Urban Atmospheric Pollution, 325

CAMP, THOMAS R.
Theory of Water Filtration, 1

CAMPBELL, FRANK B.
Boundary Layer Development and Spillway Energy Losses, with Robert C. Cox and Marden B. Boyd, 872

CAMPENELLA, RICHARD G.
See James K. Mitchell

CARHART, FRANK MILTON
Memoir of, 889

CARR, JAMES K.
Airports and Transit Systems—the Engineer's Challenge, 233

CARR, JAMES R.
The Airport and its Approaches, with John R. Eva, 593

CARSTENS, M. R.
Water Hammer Resulting from Cavitating Pumps, with T. W. Hagler, Jr., 277

CARTER, H. R.
Better Activated Sludge by the Kessener-Brush Aeration Process, 792

CASSIDY, JOHN J.
Irrotational Flow Over Spillways of Finite Height, 866

CERMAK, JACK E.
See Hsing Chuang

CHADWICK, WALLACE L.
Are We Geared to Long-Range Objectives?, 5
The Civil Engineer and His Education, 549
A Civil Engineer—and Proud of It, 21
Civil Engineering Responsibilities and Engineering Education, 528
Contracting Conditions and Construction Quality, 500
A Design for the Future, 406
Some Challenges in Power, 657
You and Your Local Section, 222

CHADWICK, WALLACE L.
You and Your Local Section, 222

CHAJES, ALEXANDER
Torsional-Flexural Buckling of Thin-Walled Members, with George Winter, 815

CHAKKO, K. C.
Generalized Resection Method in Surveying, 421

CHANDLER, E. LAWRENCE
To Bargain or Not to Bargain, 492

CHANG, WILLIAM N.
See Desi D. Vasarhelyi

CHANG, YAO W.
Vibrations and Stability of Buckled Panels, with Ernest F. Masur, 755

CHANG, YIN-CHOW
Design of Footing for Exposed Exterior Column, 352

CHAO, JUNN-LING
Study of Static Pressure Along a Rough Boundary, with Virgil A. Sandborn, 337

CHASE, E. SHERMAN
Education for Sanitary Engineers, 301

CHEN, TIO-CHUN
Pressure Distribution on Spillway Flip Buckets, with Yun-Sheng Yu, 776

CHENOWETH, ALBERT AUSTIN
Memoir of, 890

CHESSON, EUGENE, JR.
Bolted Bridge Behavior During Erection and Service, 120

CHESSON, EUGENE, JR.
Bolted Bridge Behavior During Erection and Service, 120
High-Strength Bolts Subjected to Tension and Shear, with Norberto L. Faustino and William H. Munse, 588
See Gordon H. Sterling

CHIANG, FU-PEN
A Method to Increase the Accuracy of Moire Method, 251

CHIU, ARTHUR N. L.
Vibration of Towers as Related to Wind Pulses, with Donald A. Sawyer and Linton E. Grinter, 108

CHOW, LEE
Rice Irrigation, 724

CHOW, VEN TE
Sequential Generation of Rainfall and Runoff Data, with S. Ramaseshan, 696

CHRISTENSEN, RICHARD W.
Analysis of Clay Deformation As A Rate Process, with Tien Hsing Wu, 334

CHUANG, HSING
Turbulence Measured by Electrokinetic Transducers, with Jack E. Cermak, 743

CLARK, BRADFORD N.
See W. O. Hiltabidle, Jr.

CLARK, JOHN W.
Design of Aluminum Tubular Members, with Richard L. Rolf, 271
See James C. Young

CLEMMER, LEWIS E.
See Marion W. Wilcox

CLOUGH, RAY W.
Finite Element Analysis of Axi-Symmetric Solids, with Yusef Rashid, 98

COHEN, BENJAMIN P.
How to Inspect Construction, 591

COLGAN, FRANCIS JOSEPH
Memoir of, 891

COOK, JOHN P.
Photosensitive Plastics Extend the Range of Photoelastic Stress Studies, 711

CORRADI, PETER A.
Military Engineering in Vietnam, 617

COSTANTINO, CARL J.
See Martin A. Salmon

COX, MOSES EUGENE
Memoir of, 892

COX, ROBERT C.
See Frank B. Campbell

CRANDALL, DAVID L.
Reservoir Topography by Shoreline Plotting, 579

CRAWFORD, CARL B.
Interpretation of the Consolidation Test, 13

CRIPPEN, J. R.
Cycles in Hydrologic Data, 86

CRISMAN, W. C.
See Billy J. Harris

CULBERTSON, JAMES K.
See Joseph P. Beverage

CUMMING, JAMES D.
See Richard J. Frankel

CURTIS, KENNETH S.
The Case of the Missing Curriculum, 700

DAGAN, GEDEON
See Jacob Bear

DALLEY, D. G.
Utah—A National Forest at Vernal Goes Modern, 768

DALY, ELTON F.
Mounting Plate Glass in Sides of Flumes and Tanks, 586

DANN, HOWARD E.
Unlined Tunnels of the Snowy Mountain Hydro-Electric Authority, Australia, with W. P. Hartwig and J. R. Hunter, 17

DAVENPORT, ALAN G.
Dynamic Behavior of Massive Guy Cables, with George N. Steels, 511

DAVIS, ELLSWORTH I.
Stabilizing the Lower Mississippi River, with Ernest B. Lipscomb, 630

DE SIMONE, RALPH E.
See W. O. Hiltabidle, Jr.

DIAPER, ERNEST W. J.
Filtration Through Size-Graded Media, with Kenneth J. Ives, 771

DI MAGGIO, FRANK L.
Network Analysis of Structures, with William R. Spillers, 122

DOBBINS, WILLIAM E.
BOD and Oxygen Relationships in Streams, 225

DODGE, ALEXANDER
Influence Functions for Beams on Elastic Foundations, 102

DODGE, NICHOLAS A.
Flow Measurements at Columbia River Power Plants, 760

DONNELLY, CHARLES A.
Straight Drop Spillway Stilling Basin, with Fred W. Blaisdell, 732

DOUTY, RICHARD T.
High Strength Bolted Moment Connections, with William McGuire, 565

DRAKE, RONALD L.
See Irwin Remson

DRISCOLL, GEORGE C.
See Roger G. Slutter

DUNN, CHARLES PUTNAM
Memoir of, 893

DURELLI, AUGUST J.
Large Strain Analysis and Stresses in Linear Materials, with Alfred P. Mulzet, 139

DWYER, TIMOTHY J.
Plastic Behavior of Tubular Beam Columns, with Theodore V. Galambos, 537

EARL, AUSTIN WILMOTT
Memoir of, 894

EBEIDO, IBRAHIM A.
See Robert D. Stoll

EL DARWISH, I. A.
Torsion of Structural Beams, with Bruce G. Johnston, 428

ELDER, REX A.
See Donald R. F. Harleman

ELDRIDGE, WINFIELD H.
Preserving Survey Monuments Despite Highway Construction, 321

ELDRIDGE, WINFIELD HUGGINS
Memoir of, 895

EL-GAALY, MOHAMED ALI
Analysis of Multicell Box Gates for Dry Docks, 435

ELMS, DAVID G.
Stresses in Hyperboloids under Edge Loadings, with David P. Billington and Robert Mark, 498
The Structural Action of Pile Cluster Dolphins, with Werner E. Schmid, 816

EMMETT, WILLIAM W.
Errors in Piezometric Measurement, with James R. Wallace, 217

ENGLE, WARD W.
See Floyd P. Lacy

EPAIN, RAYMOND
Elastic Loading of High Pressure Cylinders, with Boris Vodar, 775

EVA, JOHN R.
See James R. Carr

FALK, MARK MARION
Memoir of, 896

FALTYN, NORBERT E.
See Louis J. Goodman

FAUSTINO, NORBERTO L.
See Eugene Chesson, Jr.

FELD, JACOB
Tolerance of Structures to Settlement, 398

FELDMAN, HARVEY S.
See John Lowe, III

FENGER, FRITS H.
The Metric System Now, 740

FENVES, STEVEN J.
Guide to Development and Use of Electronic Computer Programs: Introduction, 261
Guide to Development and Use of Electronic Computer Programs: Program Planning, 15
See Charles L. Miller

FIERING, MYRON B.
Multivariate Technique for Synthetic Hydrology, 107
See Nobuhiro Yotsukura

FINKEL, EDWARD B.
Composite Design Cuts Cost of Small Warehouse, 469

FISCHER, H. O.
Texas—Houston Airport, a Study in Engineer-Contractor Harmony, with Frank Newnam, 553

FISCHL, RUDOLPH F.
Missouri—Arc Welding Speeds Construction of Springfield Office Building, with Georg Klatte, 133

FISHER, JOHN W.
Analysis of Bolted Butt Joints, with John L. Rumpf, 738
Behavior of Fasteners and Plates with Holes, 854
Criteria for Designing Bearing-Type Bolted Joints, with Lynn S. Beedle, 751
See Gordon H. Sterling
See James J. Wallaert

FLATHAU, WILLIAM J.
Research in Soil Structure Interaction, 502

FLOOD, LEO P.
Air Pollution from Incinerators—Causes and Cures, 734

FOK, THOMAS D. Y.
Analysis of Nonprismatic Continuous Structures, with Thomas F. Mosure, 669

FOK, YU-SI
Analysis of Water Advance in Surface Irrigation, with A. Alvin Bishop, 669

FORD, ARTHUR C.
See M. D. Morris

FORRAY, MARVIN J.
See Martin A. Goldberg

FORRESTAL, MICHAEL J.
Response of a Cylindrical Shell to an Elastic Wave, with Dronnadula V. Reddy and George Herrmann, 52

FOSTER, HERBERT B., JR.
Nutrient Removal by Effluent Spraying, with Paul C. Ward and Arnold A. Prucha, 820

FOWLER, JOHN W.
Virginia—Construction of Chesapeake Light Station, 650

FRALICH, ROBERT W.
Combined Aerodynamic and Structural Design of Lightweight Flight Structues, 505

FRANKEL, RICHARD J.
Turbulent Mixing Phenomena of Ocean Outfalls, with James D. Cumming, 728

FRIEDMAN, MORTON B.
Spherical Elastic Plastic Shock Propagation, with Hans H. Bleich and Raymond Parnes, 76

FRIEND, FRED FORAKER
Memoir of, 897

GAGNON, ANDRÉ
See Ernest Pariset

GALAMBOS, THEODORE V.
Strength of Round Steel Columns, 257
Studies of the Ductility of Steel Structures, with Maxwell G. Lay, 812
See Timothy J. Dwyer
See Maxwell G. Lay

GALBREATH, ROBERT V.
Computer Program for Leveling Resource Usage, 596

GALLER, WILLIAM S.
Analysis of Biological Filter Variables, with Harold B. Gotaas, 237

GAUDY, ANTHONY F., JR.
See Manmohan N. Bhatla

GERAGHTY, JAMES J.
See M. D. Morris

GERHARDT, LOUIS MATHEW
Memoir of, 898

GHOSH, KALYANMAY
See Pijushkanti Som

GIBSON, ERIC J.
See Ivor L. Pinkerton

GIBSON, ROBERT E.
See Robert L. Schiffman

GILLESPIE, JAMES W.
Analysis of Truss-Plate Structures, 551

GILLIM, ROBERT MACK, JR.
Memoir of, 899

GLOYNA, EARNEST F.
See Calvin C. Patterson

GOFAS, TH. C.
Greece—A Concrete Cutoff Wall for Earthfill Peneos Dam, 529

GOLDBERG, JOHN E.
Buckling of Multistory Buildings, 60

GOLDBERG, MARTIN A.
Stresses in a Uniformly Loaded Two-Layer Circular Plate, with Malcolm Newman and Marvin J. Forray, 652

GOLDER, HUGH Q.
State-of-the-Art of Floating Foundations, 327

GOLDSMITH, ROBERT H.
Welded Connections for Space Frame Joints, 712

GOLLER, ROBERT R.
Washington—The Legacy of Galloping Gertie (Tacoma Narrows Bridge), 704

GOLUEKE, CLARENCE G.
See William J. Oswald

GOLZÉ, ALFRED R.
California—California Water Project, Power Plans and Demands, 100
California—Steel pipe for South Bay Aqueduct, 166
Educational Requirements for Water Resource Engineers, 606

GOODMAN, LOUIS J.
Preloading Results in Tank Foundation Economies, with Norbert E. Faltyn, 843
Soil Surface Compaction with a Foam-Type Explosive, with A. R. Aidun and C. S. Grove, Jr., 534

GOODMAN, RICHARD E.
See H. Bolton Seed

GORDON, PAUL
Details that Cause Failure in Timber Truss Design, 667

GOTAAS, HAROLD B.
See William S. Galler

GOULD, JAMES
See M. D. Morris

GOULD, JOHN FRANKLIN
Memoir of, 900

GRACIE, GORDON
Double Summation of Errors in Aerial Triangulation, 527

GREGORY, MALCOLM S.
Teaching Engineering Attitude to Students, 361

GRIEVES, ROBERT B.
See William F. Milbury

GRINTER, LINTON E.
See Arthur N. L. Chiu

GROSS, WILLIAM M.
A Lawyer Looks at Stream Pollution, 243

GROVE, C. S., JR.
See L. J. Goodman

HADJITHEODOROU, CHRISTOS
See James A. Ligget

HAGLER, T. W., JR.
See M. R. Carstens

HALE, JOHN S.
A New and Better Foreign Technical Assistance Program, 439

HALL, WILLIAM J.
See Richard N. Wright

HALLMARK, DASEL E.
Stability of Channels by Armorplating, with George L. Smith, 796

HAMMAD, HAMMAD Y.
Natural Drainage of River Valleys, 227

HAMMING, KENNETH W.
See Richard N. Bergstrom

HANSEN, VAUGHN E.
See C. Earl Israelsen

HARDIN, BOBBY O.
The Nature of Damping in Sands, 299

HARDISON, ALLEN CROSBY
Memoir of, 901

HARLEMAN, DONALD R. F.
Withdrawal from Two-Layer Stratified Flows, with Rex A. Elder, 764

HARPER, GOIN N.
See Alfredo H. S. Ang

HARRIS, BILLY J.
Face-Wrinkling Mode of Buckling of Sandwich Panels, with W. C. Crisman, 575

HARRIS, GARTH S.
An Inclined Plume, 416

HARRIS, M. K.
California—Planning and Anchoring 12 Miles of Big Pipe for Santa Clara County, 345

HARTWIG, W. P.
See H. E. Dann

HATTERSLEY, RALPH T.
Hydraulic Design of Pump Intakes, 347

HEDLEY, WILLIAM J.
The State of the Society, 879

HEDMAN, E. ROBERT
Effect of Spur Dikes on Flow Through Contractions, 722

HELBOCK, WILLIAM P.
Barge Decks Resurfaced with Asphalt, 627

HELY, ALLEN G.
Areal Variations of Mean Annual Runoff, 41

HENDERSON, GEORGE L.
Dynamic Structural Analysis with Short Time History, 253

HENRY L.
See Masanobu Shinozuka

HERBICH, JOHN B.
Large-Scale Roughness in Open-Channel Flow, with Sam Shulits, 386

HERRMANN, GEORGE
See Michael J. Forrestal

HERSEY, A. T.
Do's and Don'ts of Cold-Weather Concreting, 464

HERTZBERG, RUDOLF
Foreshore Protection, Lower Mississippi River, 573

HICKS, STEACY D.
Yearly Sea Level Variations for the United States, with William Shofnos, 456

HIEMSTRA, LOURENS A. V.
See Brian M. Reich

HILL, CLAIR A.
Fringe Benefits in Civil Engineering Compensation, 432

HILL, RAYMOND A.
Future Quantity and Quality of Colorado River Water, 837
Transitory Irrigation Developments, 211

HILTABIDLE, W. O., JR.
Quality Control in Construction, with Bradford N. Clark, Charles E. Schaffner, John Nelson Linn, Ralph E. De Simone, Arnold H. Vollmer, Elmer B. Isaak, Leslie D. Long, Richard Q. Praeger, and Hal W. Hunt, 660

HIRTLE, GORDON
See Seymour Wengrovitz

HOLM, T. A.
Thermal Stresses Due to Unequal Thermal Coefficients of Concrete and Reinforcing Steel, 144

HOLMES, WILLARD LEWIS
Memoir of, 902

HONG, H.
See Bruce A. Lind

HOOPER, DON R.
See James K. Mitchell

HOPKINS, GLEN J.
Missouri—Pollution Abatement Program for Kansas City, with Omar C. Hopkins and Jim S. Noel, 571

HOPKINS OMAR C.
See Glen J. Hopkins

HORN, HARRY M.
Settlement of Buildings on the MIT Campus, with T. William Lambe, 221

HORNING, D. O.
See William J. Oswlad

HORONJEFF, ROBERT
Jet Transport Characteristics Related to Airports, with Gale Ahlborn, 150

HORSTMAN, WILLIAM L.
Barge Docks for Inland Waterways, 703

HOWARD, BURL W.
CPM—As Complete Project Management, 628

HOWARD, R. B.
Belleville Locks on Ohio River, 621

HOWELL, DAVID T.
Nonuniformity and Sprinkler Application Efficiency, 804
Sprinkler Nonuniformity Characteristics and Yield, 814

HRENNIKOFF, ALEXANDER P.
Importance of Strain Hardening in Plastic Design, 856

HRIBAR, JOHN A.
See Russel C. Jones

HUDDLESTON, JOHN V.
Analysis of an Inelastic Column, 787

HUGHES, G. T.
See Earle J. Klohn

HUNT, HAL W.
How to Improve Quality Control of Construction, 698
Sweden—Building Foundation Built as a Caisson for Port Storage in Stockholm, 39
See W. O. Hiltabidle, Jr.

HUNTER, J. R.
See H. E. Dann

HURST, REX L.
See Lyman S. Willardson

HUSAIN, HUSAIN M.
See Alan L. Yettram

IBRAHIM, HASSAN ALI
Inflow Hydrographs from Large Unconfined Aquifers, with Wilfied Brutsaert, 864

IPPEN, ARTHUR T.
See Frederic Raichlen

IRVIN, LESLIE A.
California—Rapid-Transit Test Track for San Francisco, 496

ISAAK, ELMER B.
See W. O. Hiltabidle, Jr.

ISRAELSEN, C. EARL
Evaporation Reduction on Large Reservoirs, with Vaughn E. Hansen, 784

IVES, KENNETH J.
See Ernest W. J. Diaper

IYENGAR, K. T. SUNDARA RAJA
Influence Lines for Beams on Elastic Foundations, with S. Anantharamu, 643

JAHANSHAHI, ARDESHIR
Elastic Plates Subjected to Moving Heat Sources, 450

JARVIS, ROBERT B.
Legal Aspects of Quality Control, 600

JENNINGS, PAUL C.
Earthquake Response of a Yielding Structure, 453

JENSEN, J. E. N.
Missouri—St. Louis Steel Arch, Symbol of the Spirit of the Pioneers, 594

JOHNSON, S. M.
See T. C. Kavanagh

JOHNSTON, BRUCE G.
An Awareness of Reality, 31
Inelastic Buckling Gradient, 331
See I. A. El Darwish

JOHNSTON, WILLIAM R.
See Arthur F. Pillsbury

JONAS, ERNEST
Subsurface Stabilization of Organic Silty Clay by Precompression, 242

JONES, RUSSEL C.
Grain Size and Loading Effects on Steel, with John A. Hribar, 56

KAO, JAO-SHIUN
Bending of Circular Sandwich Plates, 438

KASHEF, ABDEL-AZIZ I.
Exact Free Surface of Gravity Wells, 798

KAUFMAN, R. I.
Engineering Measurements for Port Allen Lock, with W. C. Sherman, Jr., 29

KAVANAGH, THOMAS C.
Arecibo Radar-Radio Telescope—Design and Construction, with David H. H. Tung, 625
Structural Maintenance—the Third Element in the Structural Engineer's Professional Package, with S. M. Johnson, 309

KEIM, S. RUSSELL
Elastic Stability of Radially Nonhomogeneous Rings, 786

KEINER, EDWARD P., JR.
Post-tensioned Viaduct Piers, 79

KELLER, JACK
Effect of Irrigation Method on Water Conservation, 834

KELLERMANN, JOHN L.
Toronto Office-Building Complex Breaks Records, 368

KENNEY, T. CAMERON
Pore Pressures and Bearing Capacity of Layered Clays, 462

KENNEY, T. CAMERON
Pore Pressures and Bearing Capacity of Layered Clays, 462
See Lauritis Bjerrum

KHAN, A. R.
See P. J. Anderson

KHAN, FAZLUR R.
Interaction of Shear Walls and Frames, with John A. Sbarounis, 247

KIDBY, HAROLD A.
"Placed-Stone" Jetty, Stone-Weight Coefficients, with Samuel B. Powell and Arthur L. Roberts, 203

KINDSVATER, CARL E.
Trend in Water Resources Education, 369

KIRKHAM, DON
See Sadik Taksoz

KIRKLAND, GEORGE H.
Florida—Criteria for Construction in Creating Another Cape Kennedy Colossus, 694

KJAERNSLI, B.
See Lauritis Bjerrum

KLATTE, GEORG
See Rudolph F. Fischl

KLAWITTER, RALPH A.
Forest Drainage Research in the Coastal Plain, with Cortland E. Young, Jr., 736

KLOHN, EARLE J.
Buckling of Long Unsupported Timber Plates, with G. T. Hughes, 235

KNAPP, DOUGLAS J.
See W. Douglas Baines

KNAPP, WILLIAM J.
See Francis R. Shanley

KOSTRO, GEORGE M.
The Prestressed Glued Joint for Steel Connections, 294

KRIZEK, RAYMOND J.
Approximation for Terzaghi's Bearing Capacity Factors, 55

KROKOSKY, EDWARD M.
An Applied Science of Materials for Civil Engineers, 436

KRYNICKI, EDWARD J.
Frames of Solid Bars of Varying Cross Sections, with Zbigniew E. Mazurkiewicz, 716

KUPFERMAN, ARNOLD
See Armando Balloffet

LACY, FLOYD P. JR.
Tenn.—Nickajack Dam, a Replacement for Hales Bar, with Ward W. Engle, 391

LAIRD, MAX O.
Arctic Siting and Surveying, 829

LAMBE, T. WILLIAM
Methods of Estimating Settlement, 65
See Harry M. Horn

LANGE, FRED E.
Washington—Seattle's Record-Breaking Sewage-Treatment System, 151

LANGFELDER, LEONARD J.
See Roy E. Olson

LASZLO, GEORGE
Expanding a Prestressed Concrete Plant, 259

LAUGHLIN, JAMES E.
Studies in Force Main Aeration, 179

LAVERTY, BRUCE R.
See Ralph W. Spencer

LAWRANCE, CHARLES H.
Design Aspects of Lompoc Water Treatment Plant, 275

LAWSON, LEROY D.
Chile—Seabees Give Technical Assistance in Chile, 110

LAY, MAXWELL G.
Flange Local Buckling in Wide-Flange Shapes, 806
Inelastic Steel Beams Under Uniform Moment, with Theodore V. Galambos, 832
Yielding of Uniformly Loaded Steel Members, 800
See Theodore V. Galambos

LAZARR, THADDEUS R. L.
Waterproofing Below the Ground Line, 400

LEDBETTER, JOE E.
Environmental Hazards of Radioactive Wastes, 615

LEE, LAWRENCE H. N.
See Alan J. Malvick

LELAND, THOMAS E.
Short Span Sag Calculations with Insulator Bells, 127

LENZ, ARNO T.
See David A. Woolhiser

LEONARDS, GERALD A.
Compressibility of Clay, with Adolph G. Altschaeffl, 303

LIBOVE, CHARLES
Complementary Energy Method for Finite Deformations, 414
Complementary Energy Theorem for Symmetric Shells, 623

LIGGET, JAMES A.
Initial Motion Problem in Porous Media, with Christos Hadjitheodorou, 408

LIN, PING-CHUAN
See James V. Parcher

LIN, T. Y.
Two Large Shells of Post-Tensioned Precast Concrete—Oklahoma Arena and Arizona Coliseum—with Ben W. Young, 488

LIND, BRUCE A.
Traffic Accident Study on Milwaukee Expressway, with H. Hong, 810

LINN, JOHN NELSON
See W. O. Hiltabidle, Jr.

LINSLEY, RAY K.
See James A. Morgali

LIPSCOMB, ERNEST B.
See Ellsworth I. Davis

LITTLE, WILLIAM A.
Computer System Designed for Teaching and Structural Research at MIT, with Kenneth F. Reinschmidt, 542

LITTLE, ROBERT W.
See Alois L. Schlack

LITTLEFIELD, J. N.
Charts Simplify Reinforced-Masonry Design, 485

LO, KWAN YEE
Stability of Slopes in Anisotropic Soils, 518

LOEHR, RAYMOND C.
An Oxidation Pond as a Tertiary Treatment Device, with Ralph L. Stephenson, 877

LOMAX, CLAUD C.
Spillway Discharge Coefficients for Rock Island Dam, 539

LONG, LESLIE D.
See W. O. Hiltabidle, Jr.

LOWE, JOHN, III
Consolidation Testing with Back Pressure, with Philip F. Zaccheo and Harvey S. Feldman, 121

LU, LE-WU
Inelastic Buckling of Steel Frames, 870

LU, ZUNG-AN
See Egor P. Popov

LUEDER, DONALD R.
See M. D. Morris

LUNDGREN, RAYMOND
See H. Bolton Seed

LYCAN, DANIEL L.
Engineering Challenges of Lunar Exploration, 726

MACKALL, MURRAY RANDOLPH
Memoir of, 903

MAGRUDER, WILLIAM
Operation of the Supersonic Transport at Airports, 351

MAHER, F. J.
Wind Loads on Basic Dome Shapes, 103

MALVICK, ALLAN J.
Buckling Behavior of an Inelastic Column, with Lawrence H. N. Lee, 692

MARK, ROBERT
See David G. Elms

MARTEL, ROMEO RAOUL
Memoir of, 904

MARTIN, JOHN B.
Impulsive Loading Theorems for Rigid-Plastic Continua, 746

MAST, PAUL E.
Analysis Comparisons for Single Curved Shell Roofs, 790

MASUR, ERNEST F.
See Yao W. Chang

MATALAS, N. C.
See Manuel A. Benson

MATHEWSON, RALPH GEORGE
Memoir of, 905

MATTIMOE, JOHN J.
Rock Trap Experience in Unlined Tunnels, with E. Roy Tinney and W. Weston Wolcott, 33

MAZURKIEWICZ, ZBIGNIEW E.
See Edward J. Krynicki

McCRAW, J. C.
Alabama—Low Cement Content for Mass Concrete in TVA's Guntersville Lock, 634

McGAUHEY, P. H.
Folklore in Water Quality Standards, 412

McGUIRE, WILLIAM
See Richard T. Douty

McKINLEY, DONALD
Field Observations of Structures Damaged by Settlement, 316

McKINNEY, ROSS E.
Evaluation of Two Aerated Lagoons, with Henry H. Benjes, Jr., 842
Ph.D. and P.E. in Civil Engineering Education, 219

McNEARY, SAMUEL S.
See Irwin Remson

McNOWN, WILLIAM COLEMAN
Memoir of, 906

McPHEE, WALTER T.
Water Supply for Saigon, 426

MEYER, WALTER L.
Extending CPM for Multiform Project Time-Cost Curves, with Louis R. Shaffer, 491

MEYERHOF, GEORGE G.
Shallow Foundations, 441

MILBURY, WILLIAM F.
Compartmentalization of Aeration Tanks, with Wesley O. Pipes and Robert B. Grieves, 748

MILLER, ALFRED LAWRENCE
Memoir of, 907

MILLER, CHARLES L.
Guide to Development and Use of Electronic Computer Programs: Computers and Programming, with Steven J. Fenves, 3

MILLER, EDMOND T.
Electronics in Surveying, 307
See Robert V. Whitman

MINSHALL, NEAL E.
New Type Weir Construction for Small Watersheds, with Ralph G. Spomer, 189

MISSIMER, HERTEL C.
Avoiding Utility Interference Underground, 557

MITCHELL, JAMES K.
Permeability of Compacted Clay, with Don R. Hooper and Richard G. Campenella, 647

MOORE, JOE T.
North Carolina—Controlling Leakage from Cowans Ford Dam, 357

MOORE, PETER J.
See Robert V. Whitman

MORGALI, JAMES R.
Computer Analysis of Overland Flow, with Ray K. Linsley, 857

MORRIS, M. D.
Water for the World, with William E. Wood, James J. Geraghty, James Gould, Gordon R. Williams, Donald F. Othmer, Donald R. Lueder, Malcolm Pirnie, Jr., and Arthur C. Ford, 802

MORROW, COLE
Planning a National Airport System to Serve the 70's, 512

MOSES, FRED
Inelastic Frame Buckling, 153
Optimum Structural Design Using Linear Programming, 171

MULZET, ALFRED P.
See August J. Durelli

MUNSE, WILLIAM H.
See Eugene Chesson, Jr.
See Bruce G. Rogers

MURPHY, LEE ORLO
Memoir of, 908

NAKIVIL, RICHARD MERTON
Memoir of, 909

NATH, B.
See O. C. Zienkiewicz

NEALE, LAWRENCE C.
Flow Characteristics of PVC Sewer Pipe, with Robert E. Price, 840

NEUGOLD, HARRY, JR.
Understanding and Controlling Corrosion, 239

NEUMANN, DONALD L.
Mathematical Method for Blending Aggregates, 64

NEWMAN, MALCOLM
See Martin A. Goldberg

NEWNAN, DONALD G.
Designing Isolated Footings against Overturning, 672

NEWNAM, FRANK H.
See H. O. Fischer

NOEL, JIM S.
See Glen J. Hopkins

NOORANY, I.
In-Situ Strength Characteristics of Soft Clays, with H. Bolton Seed, 323

NORDBY, GENE M.
Where Is Engineering Education Today?—from the Educator's Viewpoint, 129

NUNN, HENRY EDWIN
Memoir of, 910

NYMAN, FRANK
Alaska—Plastic Insulation vs. Deep Trenching for Seldovia Water Mains, 207

OBERMAN, LEONARD S.
Functional Planning of Bulk Material Ports, 88

OERTEL, GERHARD
Slow Viscous Flow of an Incompressible Suspension, 494

OJALVO, MORRIS
See Jorge Y. Tamayo

OLESON, GRANVILLE, II
Memoir of, 911

OLKO, STEPHEN M.
Marinas and Yacht Clubs—Planning and Financing, 353

OLSON, ROY E.
Pore Water Pressures in Unsaturated Soils, with Leonard J. Langfelder, 365

ORR, CHARLES I.
Florida—Liaison Insures Quality Control for Vehicle Assembly Building at Cape Kennedy, 773

OSWALD, WILLIAM J.
Closed Ecological Systems, with Clarence G. Golueke and D. O. Horning, 868

OTHMER, DONALD F.
See M. D. Morris

OTTO, WILLIAM C.
See George B. Wallace

PAGAN, ALFRED R.
County Rain-Gage Network Useful in Design, with Ronald Rothenberg, 269

PALMER, ALFRED H.
Steel Fabrication Drawings by Computer, with Herbert T. Blomquist, 116

PARCHER, JAMES V.
Some Swelling Characteristics of Compacted Clays, with Ping-Chuan Liu, 641

PARISET, ERNEST
High Lift Locks: Some Hydraulic Problems and Solutions, with André Gagnon, 131

PARKER, LEWIS E.
Highway Plans from Photogrammetrically-Compiled Maps, 364

PARKHURST, JOHN D.
Progress in Waste Water Re-Use in Southern California, 569

PARNES, RAYMOND
See Morton B. Friedman

PARSONS, D. A.
Cellular Concrete Block Revetment, with R. P. Apmann, 128

PARTHENIADES, EMMANUEL
Erosion and Deposition of Cohesive Soils, 319

PATTERSON, CALVIN C.
Dispersion Measurement in Open Channels, with Earnest F. Gloyna, 46

PATTON, DENVER S., JR.
Hydraulic Testing of the 24-in. Leidy Line, 656

PECK, RALPH B.
Pile and Pier Foundations, 224

PEDRO, J. OLIVEIRA
See J. Laginha Serafim

PENZIEN, JOSEPH
See Egor P. Popov

PERRONE, NICHOLAS
Calculating Deflections of a Partially Collapsed Frame, with Michael C. Soteriades, 383

PETERSON, JOHN
Wood Beams Prestressed with Bonded Tension Elements, 379

PETROFSKY, ALFRED M.
Contractor's View on Unlined Tunnels, 43

PEURIFOY, R. L.
Electric Controls for Laying Smooth Pavements, 757
Lateral Pressure of Concrete on Formwork, 679

PFRANG, EDWARD O.
Behavior of Restrained Reinforced Concrete Columns, with Chester P. Siess, 341
Predicting Structural Behavior Analytically, with Chester P. Siess, 289

PHELAN, JOHN T.
See Tyler H. Quackenbush

PILLSBURY, ARTHUR F.
Tile Drainage Performance, Coachella Valley, California, with J. R. Spencer, William R. Johnston, and L. O. Weeks, 9

PINKERTON, IVOR L.
Tumut 2 Underground Power Plant, with Eric J. Gibson, 23

PINELLO, NICK
Colorado—70-ft Underpass of Corrugated Steel Pipe for Broadmoor Hotel, Colorado Springs, 638

PIPES, WESLEY O.
See William F. Milbury

PIRNIE, MALCOLM, JR.
See M. D. Morris

PITTELKO, HARVEY P.
Vertical Forces in the Alaska Earthquake of March 1964, 49

PLANTEMA, IR G.
The Netherlands—Rotterdam's Rapid Transit Tunnel, 520

POIROT, JAMES W.
Alaska—Utilities for a Relocated Town in Valdez, 173

POPOV, EGOR P.
Finite Element Solution for Axisymmetrical Shells, with Joseph Penzien and Zung-An Lu, 114
Shakedown Analyses of Some Typical One-story Bents, with Eric Becker, 186
See Vitelmo V. Bertero

POSEY, C. J.
Are Flood-Plain Regulations Sound?, 417

POWELL, SAMUEL B.
See Harold A. Kidby

PRAEGER, RICHARD Q.
See W. O. Hiltabidle, Jr.

PRICE, JAMES T.
Flow-Induced Vibrations—Experience of TVA with Hydraulic and Other Structures, 245

PRICE, ROBERT E.
See Lawrence C. Neale

PROCTOR, CHARLES M.
Life Support Requirements for Space Missions, 155

PRUCHA, ARNOLD A.
See Herbert B. Foster, Jr.

PULLING, RONALD W.
Financing Future Intercity Transportation Systems, 817

PSCHUNDER, RALPH J.
Tilt and Deflections of Tapered Polygonal Towers, 143

QUACKENBUSH, TYLER H.
Irrigation Water Requirements of Lawns, with John T. Phelan, 849

QUICK, MICHAEL C.
River Flood Flows, Forecasts and Probabilities, 546

QUINBY, HENRY D.
Planning Public Mass Transportation, 827

QUIRIN, EDWARD J.
The American Consulting Engineer Abroad, 161

QUON, JIMMIE E.
Intensity of Radiation and Rate Sludge Drying, with Thomas A. Tamblyn, 249

RAICHLEN, FREDERIC
Wave-Induced Oscillations in Harbors, with Arthur T. Ippen, 183

RAINER, JOHANN H.
See Alfredo H. -S. Ang

RAJARATNAM, NALLAMUTHU
Submerged Hydraulic Jump, 633

RAMASESHAN, S.
See Ven Te Chow

RAND, WALTER
Flow Over a Vertical Sill in an Open Channel, 794

RASHID, YUSEF
See Ray W. Clough

RAUDKIVI, A. J.
Measurement of Ruffled Water Surface Elevation, 288

RAWLINGS, BARRY
Dynamic Changes of Mode in Rigid-Plastic Structures, 176

RECHARD, PAUL A.
Determining Bank Storage of Lake Mead, 639

REDDY, DRONNADULA V.
See Michael J. Forrestal

REICH, BRIAN M.
Tacitly Maximized Small Watershed Flood Estimates, with Lourens A. V. Hiemstra, 753

REINSCHMIDT, KENNETH F.
See William A. Litle

REITZ, HENRY M.
Foundations on Fissured Limestone—How They Were Selected, 543

REMSON, IRWIN
Ground-Water Models Solved by Digital Computer, with Charles A. Appel and Raymond A. Webster, 855
Vertical Drainage of an Unsaturated Soil, with Ronald L. Drake, Samuel S. McNeary, and Edward M. Wallo, 223

RHODY, FRANCIS J.
Aircraft Arresting System, 685

RIBBLE, GEORGE E.
Graphical Method for Discounting Future Benefits in Feasibility Studies, 662

RICHARDSON, EVERETT V.
See Avery A. Bishop

RICHARDSON, JOE T.
Measuring Structural Behavior of Glen Canyon Dam, 410

ROBERTS, ARTHUR L.
See Harold A. Kidby

ROGERS, BRUCE G.
Plastic Analysis and Design of Non-Prismatic Members, with William H. Munse, Jr., 366

ROLF, RICHARD L.
See John W. Clark,

ROORDA, JOHN
Stability of Structures with Small Imperfections, 63

ROPES, GILBERT E.
Vertical Control on the Great Lakes, 561

ROSENBLUETH, EMILIO
Probabalistic Design to Resist Earthquakes, 112

ROSENHAUPT, SAKY
Masonry Walls on Continuous Beams, with Yehuda Sakal, 504

ROTHENBERG, RONALD
See Alfred R. Pagan

ROUSE, HUNTER
Critical Analysis of Open-Channel Resistance, 851

ROWE, PETER W.
See D. H. Shields

ROZVANY, GEORGE I. N.
Optimum Synthesis of Prestressed Structures, 157

RUFFIN, J. V.
Steel Offshore Towers as Navigation Aids, 645

RUMPF, JOHN L.
See John W. Fisher

RUTLEDGE, PHILIP C.
Apollo-A Trip to the Moon—Symposium, (3) Vertical Assembly Building—Design of Foundations, 67

SAKAL, YEHUDA
See Saky Rosenhaupt

SALISBURY, EUGENE FRANKLIN
Memoir of, 912

SALMON, MARTIN A.
Crushable Materials for Structural Blast Shields, with Carl J. Costantino, 191

SANDBORN, VIRGIL A.
See J. L. Chao

SANTINA, WILLIAM J.
Duplicate Locks for Illinois Waterway, with George B. Wesler, 159

SATYANARAYANA, B.
Earth Pressures for Bilinear Backfill Surface, 295

SAWYER, DONALD A.
See Arthur N. L. Chiu

SAWYER, ROBERT
Utah—Lift Slabs (in Salt Lake City) Cast under Plastic Cover for Raising in Spring, 454

SBAROUNIS, JOHN A.
See Fazlur R. Khan

SCHAFFNER, CHARLES E.
See W. O. Hiltabidle, Jr.

SCHIFFMAN, ROBERT L.
Consolidation of Nonhomogeneous Clay Layers, with Robert E. Gibson, 659

SCHLACK, ALOIS L.
Elastostatic Problem of a Perforated Square Plate, with Robert W. Little, 51

SCHMID, WERNER E.
See David Elms

SCHMIDT, EUGENE ALBERT
Memoir of, 913

SCHMIDT, HARRY P.
See R. Dixon Speas

SCHMIDT, LEWIS C.
Restraints Against Elastic Lateral Buckling, 819

SCHNELLER, FRANK
Interstate = Benefits (Lives + Dollars), 313

SCHULTZ, ALBERT B.
See Kenneth E. Blanchard

SCHUSTER, JACK C.
Canal Discharge Measurements with Radioisotopes, 359

SCHWARTZ, H. IVAN
Nappe Oscillation, 71

SCOTT, MARION B.
See Robert R. Snell

SCOTT, RONALD F.
Lunar Problems in Soil Engineering, 710

SCOTT, VERNE H.
See Mahmoud A. Abu-Zied
See Gert Aron

SEARES, FREDERICK D.
See Arthur E. Bruington

SEED, H. BOLTON
Clay Mineralogical Aspects of the Atterberg Limits, with Richard J. Woodward and Raymond Lundgren, 285
Earthquake Stability of Slopes of Cohesionless Soils, with Richard E. Goodman, 466
Fundamental Aspects of the Atterberg Limits, with Richard J. Woodward and Raymond Lundgren, 531
See I. Noorany

SELF, MORRIS W.
Ultimate Strength of Reinforced Concrete Flat Slabs, 27

SELIG, ERNEST T.
Shock-Induced Stress Wave Propagation in Sand, with Eben Vey, 125

SERAFIM, J. LAGINHA
Seismic Study of Arch Dams, with J. Oliveira Pedro, 590

SHAFFER, LOUIS R.
See Walter L. Meyer

SHANK, W. H.
The Amazing Pennsylvania Canals, 57

SHANLEY, FRANCIS R.
Ceramics as Structural Materials, with William J. Knapp, 403

SHAW, J. D.
See S. D. Alpert

SHAW, JOHN A.
Understanding the Corrosion Resistance of Concrete Pipe, 396

SHERMAN, W. C., JR.
See R. I. Kaufman

SHIELDS, D. H.
Radial Drainage Oedometer for Laminated Clays, with P. W. Rowe, 339

SHIKLES, JAMES WALLACE
Memoir of, 914

SHINOZUKA, MASSANOBU
Probability of Structural Failure Under Random Loading, 165
Random Vibration of a Beam Column, with L. Henry, 611

SHOFNOS, WILLIAM
See Steacy D. Hicks

SHULDINER, PAUL W.
See Donald S. Berry

SHULITS, SAM
See John B. Herbich

SIECKE, KURT HUGO
Memoir of, 914

SIESS, CHESTER P.
See Edward O. Pfrang
See Mortimer D. Vanderbilt

SIEV, AVINADAV
Geometry of Suspended Cloth Roofs, 859

SIMONS, DARYL B.
See Avery A. Bishop

SLUTTER, ROGER G.
Flexural Strength of Steel and Concrete Composite Beams, with George C. Driscoll, 823

SMITH, GEORGE L.
See Dasel E. Hallmark

SMITH, WILBUR S.
Transportation Centers, 137

SNELL, ROBERT R.
Reinforcing for a Rectangular Opening in a Plate, with Marion B. Scott, 463

SNYDER, WILLARD M.
Men, Models, Methods, and Machines in Hydrologic Analysis, with John B. Stall, 555

SOBEL, MATTHEW J.
See Robert V. Thomann

SOLIMAN, MOSTAFA M.
Boundary Flow Considerations in the Design of Wells, 391

SOM, PIJUSHKANTI
Anchor Zone Stresses in Prestressed Concrete Beams, with Kalyanmay Ghosh, 94

SOTERIADES, MICHAEL C.
See Nicholas Perrone

SOZEN, METE A.
See Mortimer D. Vanderbilt

SPEAS, R. DIXON
Influence of V/STOL Aircraft on Airport Design, with Harry P. Schmidt, 742

SPENCER, J. R.
See Arthur F. Pillsbury

SPENCER, RALPH W.
Unlined Tunnels of the Southern California Edison Company, with Bruce R. Laverty and Dean A. Barber, 73

SPILLERS, WILLIAM R.
Lateral Response of Piles, with Robert D. Stoll, 231
On Composite Beams, 836
See Frank L. Di Maggio

SPINDEL, PAUL D.
Stadia—an Automatic Data Input Assembler for Topographic Surveys, 580

SPOMER, RALPH G.
See Neal E. Minshall

SRIDURONGKATUM, PACHERN
See Norbert L. Ackermann

STACEY, WILLIAM ARTHUR, III
Memoir of, 915

STAHL, FRANK
See Milton Brumer

STALL, JOHN B.
See Willard M. Snyder

STEELS, GEORGE N.
See Alan G. Davenport

STEINBRUGGE, JOHN
Improved Inspection on the West Coast, 613

STELZENMULLER, WILLIAM B.
Tidal Characteristics of Two Estuaries in Florida, 545

STEPHAN, DAVID G.
Water Renovation—Some Advanced Treatment Processes, 563

STEPHENSON, RALPH L.
See Raymond C. Loehr

STERLING, GORDON H.
Calibration Tests of A490 High-Strength Bolts, with Emile W. J. Troup, Eugene Chesson, Jr. and John W. Fisher, 583

STOLL, ROBERT D.
Shock Waves in Granular Soil, with Ibrahim A. Ebeido, 459
See William R. Spillers

STRELKOFF, THEODOR S.
Solution of Highly Curvilinear Gravity Flows, 355

SUESS, MICHAEL J.
Hydraulic Performance Comparison of Centrifugal Pumps, 404

SUN, CHIN-TEH
See Jan D. Achenbach

SUTTON, WALTER G.
See Eugene W. Weber

SWAMINATHAN, K. V.
Development of Arch Action in Arch Dams, 135

SWEET, ARNOLD L.
Stochastic Model for Predicting Subsidence, with John L. Bogdanoff, 59
Validity of a Stochastic Model for Predicting Subsidence, 783

TABLER, L. EARL, JR.
Installation Procedure for Hot Metal Facility, 7

TALBOT, DOUGLAS W.
Municipal Engineering Is a Profession, 263

TAMAYO, JORGE Y.
Buckling of Three-Legged Columns with Batten Bracing, with Morris Ojalvo, 419

TAMBLYN, THOMAS A.
See Jimmie E. Quon

TANG, SING-CHIH
Dynamic Response of a Tube Under Moving Pressure, 730

TANIMOTO, BENNOSUKE
Operational Method for Continuous Beams, 423

TAUCHERT, THEODORE R.
Shock Response of a Simple Beam on Nonlinear Supports, with Robert S. Ayre, 862

TEDESKO, ANTON
Apollo—A Trip to the Moon—Symposium, (2) Design of the Vertical Assembly Building, 53

TESTIN, G. D.
Combination Water Systems for High-Rise Buildings, 232

TEZCAN, SEMIH S.
Minimum Base Lengths for Cantilever Retaining Walls, 683

THEOPHIL, C.
See M. M. Braverman

THOMANN, ROBERT V.
Estuarine Water Quality Management and Forecasting, with Matthew J. Sobel, 808

THOMAS, HENRY H.
Tunnels for Hydroelectric Power in Tasmania, with Lindsay S. Whitham, 84

THOMAIDES, SPIRO S.
Earthquake Response of Systems with Bilinear Hysteresis, 26

THOMPSON, ARNOLD W.
Evolution and Future of Airport Passenger Terminals, 297

THOMPSON, CHARLES B.
Irrigation Water Requirements in Texas, 200

TILP, PAUL J.
Capacity Tests in Large Concrete-Lined Canals, 846

TINNEY, E. ROY
See John J. Mattimoe

TOAKLEY, A. RAYMOND
Buckling Loads for Elastically Supported Struts, 168

TODD, DAVID K.
Nuclear Craters for Water Resources Development and Management, 329

TOKSÖZ, SADIK
Two-Dimensional Infiltration and Wetting Fronts, with Don Kirkham and E. Robert Baumann, 514

TOMALA, FRYDERICK
Inland Water Transportation in Poland, 875

TORIDIS, TEOKTISTOS
See Robert K. Wen

TRENT, DONALD J.
See Lewis Li-Tang Au

TROUP, EMILE W. J.
See Gordon H. Sterling

TROXELL, G. E.
Prestressed Lift Slabs Withstand Fire, 762

TSO, WAI KEUNG
Coupled Vibrations of Thin-Walled Elastic Bars, 175

TUNG, DAVID H. H.
See Thomas C. Kavanagh

TYER, ARNOLD J.
Arkansas—Sludge Burning at North Little Rock, 215

UNDERWOOD, LLOYD B.
Machine Tunneling on Missouri River Dams, 780

VALLASEÑOR PEÑA, GILBERT
Memoir of, 911

VANDERBILT, MORTIMER D.
Deflections of Multiple-Panel Reinforced Concrete Floor Slabs, with Mete A. Sozen and Chester P. Siess, 769

VASARHELYI, DESI D.
Misalinement in Bolted Joints, with William N. Chang, 460

VELTROP, JAN A.
Design of Karadj Arch Dam, with Roman P. Wengler, 213

VEY, EBEN
See Ernest T. Selig

VODAR, BORIS
See Raymond Epain

VOLLMER, ARNOLD H.
See W. O. Hiltabidle, Jr.

VORTMAN, LUKE J.
Nuclear Excavation of a Sea-Level Isthmian Canal, 209

WALL, WILLIAM J.
Influence of Soil Types on Stabilization of the Savannah River, 717

WALLACE, GEORGE B.
Differential Settlement at Selfridge Air Force Base, with William C. Otto, 70

WALLACE, JAMES R.
See William W. Emmett

WALLACE, STUART R.
Jet Cargo Facility Requirements, 718

WALLAERT, JAMES J.
Shear Strength of High-Strength Bolts, with John W. Fisher, 766

WALLO, EDWARD M.
See Irwin Remson

WALSH, ROBERT J.
New York—Linseed-Oil Protection for New York State Thruway Bridges, 457

WARD, JOHN C.
Turbulent Flow in Porous Media, 644

WARD, PAUL C.
See Herbert B. Foster, Jr.

WARD, JOSEPH S.
Engineering Education—From the Practitioner's Viewpoint, 147
Starting Your Own Consulting Practice—Business and Finance, 61

WATSON, LESLIE J.
Development of Ground Water in Hawaii, 401

WAUGH, JOSEPH E.
Photogrammetric Measurement of Tidal Currents, 35

WEBER, ARTHUR W.
The Dilemma of the Professional Engineers' Licensing Program, 317

WEBER, EUGENE W.
Environmental Effects of Flood Plain Regulations, with Walter G. Sutton, 805

WEBSTER, RAYMOND A.
See Irwin Remson

WEEKS, L. O.
See Arthur F. Pillsbury

WEN, ROBERT K.
Discrete Dynamic Models for Elasto-Inelastic Beams, with Teoktistos Toridis, 187

WENGLER, ROMAN P.
See Jan A. Veltrop

WENGROVITZ, SEYMOUR
New Trends in Fallout Protection, with Gordon W. Hirtle, 451

WESLER, GEORGE B.
See William J. Santina

WHIPPLE, WILLIAM, JR.
A Revolution in the Water Resources Field, 750

WHITHAM, LINDSAY S.
See Henry H. Thomas

WHITMAN, ROBERT V.
Yielding and Locking of Confined Sand, with Edmond T. Miller and Peter J. Moore, 197

WIECHMAN, HOWARD C.
Concrete Need Not Hibernate, 653

WILCOX, MARION W.
Large Deflection of Heated Plates, with Lewis E. Clemmer, 181

WILHOITE, GENE M.
Tests Verify Design for TVA's 500-kv Towers, 90

WILLARDSON, LYMAN S.
Sample Size Estimates in Permeability Studies, with Rex L. Hurst, 777

WILLIAMS, GORDON R.
See M. D. Morris

WILLIAMS, MERLIN C.
Weather Modifications, University of Wyoming, 391

WINICK, ALEXANDER B.
All-Weather Landing Systems, 759

WINTER, GEORGE
See Alexander Chajes

WISELY, WILLIAM H.
Continuing Education, 92

WISELY, WILLIAM H.
The Economies of ASCE Technical Publications, 720

WISELY, WILLIAM H.
Interprofessional Relations, 448

WISELY, WILLIAM H.
Membership Promotion in ASCE, 422

WISELY, WILLIAM H.
Product Endorsement by Engineers, 305

WISELY, WILLIAM H.
Unethical Sabotage of Public Projects, 708

WOLCOTT, W. WESTON
See John J. Mattimoe

WOOD, WILLIAM E.
See M. D. Morris

WOODWARD, RICHARD J.
See H. Bolton Seed

WOOLHISER, DAVID A.
Channel Gradients Above Gully-Control Structures, with Arno T. Lenz, 619

WRIGHT, DOUGLAS T.
Membrane Forces and Buckling in Reticulated Shells, 279

WRIGHT, RICHARD N.
Loading Rate Effects in Structural Steel Design, with William J. Hall, 195

WU, TIEN HSING
See Richard W. Christensen

YALIN, M. SELIM
Geometrical Properties of Sand-Waves, 76

YAO, LESLIE Y. C.
See Bengt B. Broms

YETTRAM, ALAN L.
Grid-Framework Method for Plates in Flexure, with Husain M. Husain, 778

YOSHIMI, YOSHIAKI
Piles in Cohesionless Soil Subject to Oblique Pull, 229

YOTSUKURA, NOBUHIRO
Numerical Solution to a Dispersion Equation, with Myron B. Fiering, 444

YOUNG, BEN W.
See T. Y. Lin

YOUNG, CORTLAND E., JR.
See Ralph A. Klawitter

YOUNG, JAMES C.
Second Order Equation for BOD, with John W. Clark, 267

YU, YUN-SHENG
See Tio-Chun Chen

ZACCHEO, PHILIP F.
See John Lowe, III

ZANONI, HERMAN P.
Collective Bargaining for Municipal Engineers, 577

ZIENKIEWICZ, O. C.
Analogue Procedure for Determination of Virtual Mass, with B. Nath, 193

ZWAMBORN, JOHAN ALBERT
Simple Apparatus for Producing Model Tides, 283